THE ADMINISTRATION'S DECISION TO LICENSE THE CHINESE LONG MARCH LAUNCH VEHICLE

HEARINGS

BEFORE THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

ONE HUNDREDTH CONGRESS

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SEPTEMBER 23 AND 27, 1988

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THE ADMINISTRATION'S DECISION TO LICENSE THE CHINESE LONG MARCH LAUNCH VEHICLE

FRIDAY, SEPTEMBER 23, 1988

House of Representatives,
Committee on Science, Space, and Technology,
Washington, D.C.

The committee met, pursuant to notice, at 9:35 a.m., in Room 2318, Rayburn House Office Building, the Honorable Robert A. Roe, [chairman of the committee] presiding.

The Chairman. The committee will come to order.

The Chair recognizes the distinguished gentleman from New Mexico, Mr. Lujan.

Mr. Lujan. Mr. Chairman, I ask unanimous consent to reconstitute the Technology Policy Task Force until the conclusion of the 100th Congress, with no changes in the membership. The members are Mr. MacKay, Mr. Brown, Mr. Walgren, Mr. Valentine, Mr. McMillen, Mr. Price, Mr. Nagle, Mr. Hayes, Mr. Skaggs, Mr. Roe, Mr. Mineta, Mr. Packard, Miss Schneider, Mr. Lewis, Mr. Henry, Mr. Fawell, Mrs. Morella and Mr. Lujan.

The Chairman. No objection to the unanimous consent request. So ordered.

Without objection, permission is granted for coverage of this meeting by television, radio and still photography.

The Chair wishes to announce to the members that we are hoping to be able to conclude this hearing today. It is lengthy, as it should be, and comprehensive. If not, we will be meeting again on Tuesday next week. For the members' interest, Secretary Carlucci will be testifying in closed session between 9:15 and 10:15. Two or three members of Congress wanted to testify, but because of the schedule this afternoon, they would be testifying on Tuesday next. I want to report that to the members of the committee.

Today the Committee on Science, Space and Technology meets to examine the implications of the export of commercial satellites for launch on the Chinese Long March Rocket. This is an issue of great long-term importance not only to America's role in science and technology but to the very foundation of our foreign policy.

Over the past year this committee has worked hard to rebuild the technological competitiveness that has been the source of this nation's strength, and that is in all fields, by the way. A major thrust of this rebuilding effort and one with which I have been personally involved, as you know, is the area of international cooperation in science and technical endeavors.

It is of the utmost importance that we define and assert our technological preeminence not only through competition but also through our leadership in cooperative international and domestic relations. This by definition forces us to see the big picture. I know that that is not always easy, but it is essential, particularly in this particular discussion we have today.

The issue we will consider today contains all of these elements and, in addition, a legitimate question pertaining to trade relations with a major non-market economy. Our challenge will be to put these facts, judgments and opinions all in perspective and to decide for ourselves what is in the public interest.

The committee's hearing is being conducted as part of the exercise of special oversight authority with respect to all non-military research and development assigned to this committee by the rules of the House of Representatives.

At the outset I want to point out that the only way we can rationally discuss the Long March issue is in the broad context of U.S.-China relations. We will hear today that the licenses to be approved will be linked to specific agreements on pricing for future launches, control of satellite interface information and certain liability terms. But the true linkages go far beyond these narrow considerations.

The United States and China can be proud of the cooperative relationships we have developed in science and technology. Since the first U.S.-China agreement was signed in 1979, over 500 joint projects have been initiated and thousands of scientists and engineers have been exchanged. The United States has more cooperative agreements with China than with any other country. Likewise, China has more cooperative agreements with the United States than any other country.

There are now over 20,000 Chinese students studying in the United States, and English, it is important to point out, is the second language in China. Certainly we have seen that the major science projects we are undertaking in the future will have a critical need for international cooperation. The International Space Station already has direct involvement by the Europeans, Japanese and Canadians. There is no doubt that China as a space-faring nation could also bring something to the table, so to speak. I look forward to the future, when China becomes an active user-participant in this program.

The other major project we have considered this year is the Super Collider. You may be surprised to know that the Shanghai Institute of Ceramics is one of the few places that has the capability of producing the sensitive detector crystals of bismuth germanate for the CERN collider in Europe. This technology could be essential to us for the success of the Super Collider.

The benefits to the United States from such cooperation are great. We must be able to take advantage of the Chinese state-of-the-art research in health, agriculture and other areas.

Our trade relations with China are of the utmost importance for both countries. In 1981 we had a $1.5 billion surplus in trade. In 1987 this fell to a $3.4 billion deficit. It has become clear that our strongest area of trade worldwide is in the aerospace products area. This remains one of the few areas which continue to show a positive balance of trade. It would be most short sighted indeed if we failed to use this economic strength in our relations with China.

One of our witnesses today represents McDonnell Douglas and will tell us of a joint agreement with the Chinese for the reduction of the MD-82 commercial aircraft. This program alone is worth $1 billion in business with the country of China.

This is the type of innovative business approach that will be our commercial future. In addition, McDonnell Douglas hopes to market upper stages for the Long March Rocket. We should strive to broaden, in my judgement, our horizons and promote this type of thinking.

We are told that the export value of the AUSSAT satellites is about $260 million. The value of the ASIASAT export is about $40 million. Thus, the license we will consider will benefit our trade balance by nearly $300 million.

Presently the United States communication satellite industry is expected to capture 60 percent of the world market for the next five years, providing in excess of $2.5 billion in export review. They can only remain competitive if we allow them to price competitively and give them access to the possible launch systems.

Make no mistake. This market is truly competitive, and I am sure we will hear about that today. The runner up to Hughes in the AUSSAT competition was a European team of British Aerospace and MATRA. The Europeans also competed strongly in the INTELSAT VII procurement. Soon the Japanese will emerge as a major player. We should not be so complacent about our past success that we fail to see the future competitive environment.

As of 1988, there were 407 U.S.-China joint ventures, worth more than $2.1 billion in United States investment. In addition, there is in excess of $940 million worth of United States investment in offshore oil development. By the end of this year, the total United States investment in China will exceed $3.9 billion.

Already, American Motors cooperates with the Chinese in the manufacture of Jeeps. Babcock and Wilcox cooperates in the power station boilers, Corning in the manufacture of glass, Hewlett-Packard in electronics, and the list goes on and on.

The China market is a vast commercial frontier and represents one-quarter of the world's population. We simply cannot afford to hamstring our private sector by short-sighted protectionist trade policies.

I know that some of my colleagues are concerned over the competition the Chinese represent in the launch services area, which I respect and understand. I am certain we can reach agreement on how to conduct this competition in a fair manner. Competition will make the ELV industry more efficient, the satellite industry will pay lower prices, and the consumer will be the beneficiary.

If the AUSSAT license is approved, the United States will be a major beneficiary. Over $250 million will be spent in the United States by Hughes and its subcontractors with over 750 jobs over the next three years.

It is worth mentioning that one central issue that we will be considering is the administration's policy toward our own emerging expendable launch vehicle industry. One of the most important pieces of legislation to come out of the committee during this Congress is H.R. 4399, Amendments to the Commercial Space Launch Act.

It became clear to us, this committee, sometime ago that in order for our launch industry to survive domestically and compete internationally, we must develop a risk-sharing regime that provides certainty to our industry and recognizes and protects them against unlimited liability.

I am pleased to recognize that on Tuesday the Senate Commerce Committee reported this bill out with some modifications that I believe will be favorably considered. It is my sincere hope that the administration will join us in endorsing this bill that is so essential to America's launch and satellite industry.

The message I want to leave with you is that we must remain competitive through aggressive and visionary policies. We must do everything we can to remove the barriers that would harm our ELV industry. The big picture, however, demands that we look to the China market, and I sincerely hope our witnesses can help us frame this issue correctly.

I want to stress that this hearing is intended to be a balanced review of the issue. We intend to hear all of the arguments for and against this decision. It is far too easy to oversimplify this issue and is far more difficult, in my judgment, to think through the merits of all of the arguments.

We have a full agenda today, and we have called upon a great many distinguished experts, responsible government officials and other interested parties to present testimony.

Before we begin, I would like now to defer to my good friend, our ranking member from the great State of New Mexico, Manuel Lujan.

Mr. LUJAN. Thank you very much, Mr. Chairman.

The subject of today's hearing, the implication of granting export license for the launch of a U.S.-built satellite on the Chinese Long March, is an extremely complex issue. As you know, it is not without considerable controversy, and you are to be commended for holding this hearing. Members need to hear all sides of the issue and understand the consequences of the approval or the denial of this license.

Mr. Chairman, most Americans have strongly supported our renewed friendship with the People's Republic of China. We have seen that friendship grow, and today Americans can work, study, do research, or simply vacation in China. Likewise, thousands of Chinese students have come to the United States to study.

Today, American and Chinese scientists are working together on hundreds of joint research projects and cooperative programs in science and technology, as you have so aptly pointed out. I believe most Americans are pleased with the status of our relations with China today, and we should be reluctant to do anything that would jeopardize these relations.

In commerce, the United States is now China's third largest trading partner, accounting for nearly one-tenth of their exports. U.S. aerospace firms are also finding a growing market for aviation and space products in China. Certainly we should be reluctant to jeopardize these relationships as well.

Nonetheless, we need to be very careful in our consideration of this license request because of the serious potential harm we can do to our own launch industry and the implications of our national security if the commercial launch industry should fail.

I congratulate the administration for their careful and considered attention to all these concerns. Clearly, this decision will be a precedent-setting decision, and I am pleased to see that careful scrutiny is being given to it.

I am especially pleased to see that as a condition of granting this license, there will have to be an agreement reached to prevent possible unfair Chinese pricing or trade practices related to launch competition.

This is a critical issue. We cannot jeopardize our own launch industry by forcing them to compete with a nation that is not governed by the same market forces that govern U.S. industry. It is not clear to me how this issue can be resolved, but in the interest of fairness to all parties, we must make every effort to do so.

I am concerned, however, that since Congress has been given only 30 days to review this request and these agreements will likely not be reached during that time, we are being asked to approve this request without fully understanding all the terms and conditions. Mr. Chairman, there are many questions that will need to be answered, and I am sure that during the course of this hearing, we will have an opportunity to learn more about this important issue.

Thank you very much.

[The prepared opening statement of Mr. Lujan follows:]

HON. MANUEL LUJAN JR.
OPENING STATEMENT
HEARING ON LONG MARCH
SEPT 23, 1988

THANK YOU MR. CHAIRMAN.

THE SUBJECT OF TODAY'S HEARING, THE IMPLICATIONS OF GRANTING AN EXPORT LICENSE FOR THE LAUNCH OF A U.S. BUILT SATELLITE ON THE CHINESE LONG MARCH, IS AN EXTREMELY COMPLEX ISSUE --- AND AS YOU KNOW, IT IS NOT WITHOUT CONSIDERABLE CONTROVERSY. YOU ARE TO BE COMMENDED FOR HOLDING THIS HEARING. MEMBERS NEED TO HEAR ALL SIDES OF THIS ISSUE AND UNDERSTAND THE CONSEQUENCES OF THE APPROVAL OR THE DENIAL OF THIS LICENSE.

MR. CHAIRMAN, MOST AMERICANS HAVE STRONGLY SUPPORTED OUR RENEWED FRIENDSHIP WITH THE PEOPLES' REPUBLIC OF CHINA. WE HAVE SEEN THAT FRIENDSHIP GROW, AND TODAY AMERICANS CAN WORK, STUDY, DO RESEARCH, OR SIMPLY VACATION IN CHINA. LIKEWISE, THOUSANDS OF CHINESE STUDENTS HAVE COME TO THE UNITED STATES TO STUDY. TODAY AMERICAN AND CHINESE SCIENTISTS ARE WORKING TOGETHER ON HUNDREDS OF JOINT RESEARCH PROJECTS AND COOPERATIVE PROGRAMS IN SCIENCE AND TECHNOLOGY.

I BELIEVE MOST AMERICANS ARE PLEASED WITH THE STATUS OF OUR RELATIONS WITH CHINA TODAY, AND WE SHOULD BE RELUCTANT TO DO ANYTHING THAT WOULD JEOPARDIZE THESE RELATIONS.

IN COMMERCE, THE UNITED STATES IS NOW CHINA'S THIRD LARGEST TRADING PARTNER, ACCOUNTING FOR NEARLY ONE TENTH OF THEIR EXPORTS. U.S. AEROSPACE FIRMS ARE ALSO FINDING A GROWING MARKET FOR AVIATION AND SPACE PRODUCTS IN CHINA, AND CERTAINLY WE SHOULD BE RELUCTANT TO JEOPARDIZE THESE RELATIONSHIPS AS WELL.

NONE THE LESS, WE NEED TO BE VERY CAREFUL IN OUR CONSIDERATION OF THIS LICENSE REQUEST, BECAUSE OF THE SERIOUS POTENTIAL HARM WE CAN DO TO OUR OWN LAUNCH INDUSTRY, AND THE IMPLICATIONS FOR OUR NATIONAL SECURITY IF THE U.S. COMMERCIAL LAUNCH INDUSTRY SHOULD FAIL.

I CONGRATULATE THE ADMINISTRATION FOR THEIR CAREFUL AND CONSIDERED ATTENTION TO ALL THESE CONCERNS. CLEARLY THIS DECISION WILL BE A PRECEDENT-SETTING DECISION, AND I AM PLEASED TO SEE THE CAREFUL SCRUTINY THAT IT IS RECEIVING. I AM ESPECIALLY PLEASED TO SEE THAT AS A CONDITION OF GRANTING THIS LICENSE, THERE WILL HAVE TO BE AN AGREEMENT REACHED TO PREVENT POSSIBLE UNFAIR CHINESE PRICING OR TRADE PRACTICES RELATED TO LAUNCH COMPETITION. THIS IS A CRITICAL ISSUE. WE CANNOT JEOPARDIZE OUR OWN LAUNCH INDUSTRY BY FORCING THEM TO COMPETE WITH A NATION THAT IS NOT GOVERNED BY THE SAME MARKET FORCES THAT GOVERN U.S. INDUSTRY.

IT IS NOT CLEAR HOW THIS ISSUE CAN BE RESOLVED, BUT IN THE INTEREST OF FAIRNESS TO ALL PARTIES, WE MUST MAKE EVERY EFFORT TO DO SO. I AM CONCERNED, HOWEVER, THAT SINCE CONGRESS HAS BEEN GIVEN THIRTY DAYS TO REVIEW THIS REQUEST, AND THESE AGREEMENTS WILL LIKELY NOT BE REACHED DURING THAT TIME, WE ARE BEING ASKED TO APPROVE THIS REQUEST WITHOUT FULLY UNDERSTANDING ALL THE TERMS AND CONDITIONS.

MR. CHAIRMAN, THERE ARE MANY QUESTIONS THAT WILL NEED TO BE ANSWERED, AND I AM SURE THAT DURING THE COURSE OF THIS HEARING WE WILL HAVE AN OPPORTUNITY TO LEARN MORE ABOUT THIS IMPORTANT ISSUE.

THANK YOU.

The CHAIRMAN. I thank the distinguished gentleman from New Mexico.

The Chair recognizes other members for an opening statement, and first will recognize the distinguished gentleman from Florida, Mr. Nelson.

Mr. NELSON. Thank you, Mr. Chairman, and I thank you for having this hearing and bringing forth some of these ideas.

Mr. Chairman, I think one of the things that will emerge from this hearing is a focus on the disarray of the space policy decisionmaking within the administration, as evidenced by how this decision of granting an export license was advocated.

Mr. Chairman, you have just spoken about our bill that just passed out of the Senate Commerce Committee the other day. Unhappily, there is circulating right now a veto message from the administration on that bill that we in this committee have so long and laboriously articulated to try to help this fledgling commercial rocket industry get off the pad, and still we are having to deal with this kind of disarray in policymaking within the administration.

Happily, both presidential candidates have both articulated that they would reestablish the National Security Council headed by the Vice President as the chairman, the national space policymaking organization that was in evidence during the 1960s. I think decisions on space policy being made in SIG, the Senior Interagency Group, or IG, the Interagency Group, or the Economic Policy Council or the National Security Council, where different bodies, each with their own constituency, is trying to articulate what space policy ought to be and not having any coherent whole has led to a very, very unhealthy situation of which this issue before us today gives us a glimpse.

Mr. Chairman, I thank you for this opportunity of examining these issues today. I think that at first blush for me—I want to hear the other side of the arguments, but at first blush to me, it seems apparent that an administration which has very eloquently through the President articulated a need for a commercial space industry, on the one hand, comes along and cuts that industry off at the knees with the other hand in the granting of an export license, when, in fact, this industry is having to compete with foreign launchers that do have subsidization from other sources, if it not be directly from their governments. So I thank you for the opportunity to air this question.

The CHAIRMAN. I want to recognize the distinguished ranking member from Pennsylvania, Mr. Walker.

Mr. WALKER. I thank you, Mr. Chairman, and I will be very brief. I just want to make it quite clear where I am coming from.

After a series of dumb decisions that have denied this nation sufficient launch capacity, the idea of transferring technology and transferring some of our launch capacity to the Chinese has to be the dumbest.

Thank you, Mr. Chairman.

The CHAIRMAN. And I thank the gentleman for his brief statement.

The Chair recognizes the distinguished gentleman from Missouri, Mr. Volkmer.

Mr. VOLKMER. Thank you, Mr. Chairman.

As one who has watched the development of the space industry not only here in the United States but throughout the world, I wish to welcome China into that space industry. As one who has seen the Chinese develop their rocket systems and their missile systems I feel that we in the Western world should be willing to accept them as competitors and that I do take the opposite view of the two previous gentlemen that have just spoken.

I wish to commend the Administration for taking the position that they have taken. The conditions that they have imposed I think fulfill all the requirements that we should ask of anyone. The security provisions, the liability provisions I think take care of the problems that should be addressed.

As far as competition, we in America are afraid of competition. If we are, then I think we ought to get out of the business. I think we should gear up for that competition. We have had the competition for the very end. I commend the Chairman for having these hearings. I think it is very worthwhile, serves a very good purpose but I just do not understand the philosophy of those who say we shouldn't let the Chinese launch American-made satellites for other countries, that were made for somebody else, not us, and yet we don't say very much about stopping American satellite manufacturers and customers such as RCA or AT&T or anybody else from flying on the Ariane.

To me, competition is competition. I believe the safeguard of our own industry that's going to be imposed by the Administration with the Chinese because of the differences in the market system should be adequate. Yes, I too believe that we should promote our own industry. As one who was sponsor of the original ELV commercial satellite legislation, I have long believed that, but on the other hand I am not afraid of competition.

The other thing that appears to me in this whole thing is that if the Administration, and we'll have witnesses testify to this and I think it is a very major point, if the Administration had turned down these licenses for export, then it also appears to me that Hughes would not have been manufacturing these satellites and that someone else would have been manufacturing the satellites and that they would have still gone on the Long March, so all the Administration would have been doing is denying employment to American citizens and denying Hughes Aircraft from being able to make these satellites.

Mr. Chairman, thank you very much.

The Chairman. The Chair recognizes the distinguished gentleman from New York, Mr. Boehlert, for an opening remark.

Mr. Boehlert. Thank you, Mr. Chairman. I will be brief also.

I come here mindful of the old adage that the mind is like a parachute. It only functions properly when it is opened and that I may be one—after hearing the opening statement—one of the few people that comes here genuinely open-minded without having set his feet firmly in concrete.

I welcome this hearing. I think the subject matter is extremely important. I am mindful of the impact on our international relations with friends, not just in China but in other nations, and I commend you for this hearing and look forward to it.

The Chairman. I thank the gentleman from New York.

The Chair recognizes the distinguished gentleman from North Carolina, Mr. Valentine.

Mr. **Valentine**. Mr. Chairman, I would like to associate myself with the Chair's remarks and with the remarks from the distinguished gentleman from New York. I appreciate the fact that we have an opportunity to come and hear this testimony and I am sure we will be enlightened and I would prefer to express any opinions that I have after we have heard the evidence.

Thank you, Mr. Chairman.

The **Chairman**. I thank the gentleman from North Carolina.

The distinguished gentleman from California, Mr. Packard.

Mr. **Packard**. Thank you, Mr. Chairman. I, too, want to applaud you for holding the hearing. It is a sensitive and difficult issue and one that we have yet to really finalize a decision on, and it is precedent-setting, but I think we must keep in mind that the policy that is ultimately established on this issue could determine whether our companies, our American high tech companies, could compete in the world marketplace for building satellites other than those that we contract for within our own country.

Australia has come to an American company and asked it to build its satellite for them, and then we are asked to make a decision as to whether we will permit that company or that country to have it launched in the most economic way, and I think those are significant decisions that we have to make.

I think we must look carefully at whether we wish to preclude the companies like Hughes and the GE's of America, whether they can build foreign satellites or not, because if they are not permitted to launch them on the cheapest launch facilities world-wide, then we may simply not get contracts for our companies to build, and I think that too needs to be very carefully considered, so I am looking forward to the testimony and hope that we will look at this—at all sides of this issue—and not only see it from one narrow view.

Thank you.

The **Chairman**. The Chair thanks the gentleman from California. The Chair recognizes the distinguished gentleman from Maryland, Mr. McMillen.

Mr. **McMillen**. Mr. Chairman, I, too, appreciate your willingness to hold these comprehensive hearings and like our Subcommittee Chairman from Florida I have some severe reservations about the Administration's policy, but I do realize there are some extenuating factors involved here.

There are lots of issues that need to be addressed here today, issues like national security, technology transfer, competitiveness, helping our own nascent industries and hard currency issues. I am particularly interested in those.

Yesterday in the House Banking Committee subcommittee we had hearings on the tremendous flow of hard currency from West to East, the tremendous amount of indebtedness that is accumulating from West to East and today I think we are exploring another niche of that issue, what is happening in regards to this flow of hard currency from West to East.

Again, I appreciate what you have done.

The CHAIRMAN. I thank Mr. McMillen from Maryland and the Chair would recognize the gentleman from Pennsylvania, Mr. Kanjorski.

Mr. KANJORSKI. Thank you, Mr. Chairman. I look forward to this hearing this morning. I hope it isn't only a question of the bottom line, because I find myself maybe joining my friend from Pennsylvania that if we are going to take the cheapest form of launchers and that is our decision-making policy in the country, perhaps we should look at the Chinese army as a substitute for our own at a much cheaper price.

The CHAIRMAN. Thank you. The Chair recognizes the distinguished gentleman, Mr. Bruce.

Mr. BRUCE. Thank you, Mr. Chairman. I welcome the chance to examine the impact of this precedent-setting issue: the impact upon the United States' commercial ELV industry, the United States satellite manufacturers, the future of United States - China trade and United States cooperation science and technology and our own national security, but our national space policy needs to be focused upon issues surrounding the health and competitiveness of our domestic satellite and telecommunications industries.

These industries combined provide thousands of jobs and their continued success needs to be assured.

Increased space technology research will play a critical role in allowing the United States companies to provide the services desired in an ever-competitive international market, and I look forward to the testimony of the expert witnesses today in examining the issues surrounding the question of the use of the Long March rocket to launch United States satellite.

The CHAIRMAN. I thank the gentleman from Illinois.

[The prepared statements of Hon. Norman Y. Mineta and Hon. David Skaggs follow:]

STATEMENT OF
NORMAN Y. MINETA, M.C.

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

WASHINGTON, D.C.
SEPTEMBER, 23 1988

I COMMEND THE CHAIRMAN FOR HIS LEADERSHIP IN HOLDING TODAY'S HEARING ON THIS IMPORTANT MATTER.

THE QUESTION OF WHETHER OR NOT HUGHES AIRCRAFT COMPANY, A U.S. SATELLITE MANUFACTURER, SHOULD BE GRANTED AN EXPORT LICENSE TO LAUNCH THEIR SATELLITES ON LAUNCH VEHICLES PROVIDED BY THE PEOPLE'S REPUBLIC OF CHINA IS A QUESTION THAT PRESENTS A NUMBER OF CHALLENGES IN TERMS OF TECHNOLOGY POLICY, INTERNATIONAL RELATIONS, AND THE COMPETITIVENESS OUR OUR COUNTRY'S AEROSPACE INDUSTRIES.

SUCCESSFULLY RESOLVING THIS THORNY QUESTION WILL MEAN BALANCING AND PROTECTING A NUMBER OF INTERESTS:

-- OUR NATIONAL SECURITY INTERESTS, WHICH REQUIRE THAT WE EXERCISE DUE CARE IN PREVENTING UNWANTED TRANSFERS OF CRITICAL TECHNOLOGIES;

-- THE INTERESTS OF U.S. SATELLITE MANUFACTURERS, WHO NEED THE FLEXIBILITY OF CHOOSING FROM A VARIETY OF LAUNCH OPTIONS IN ORDER TO REMAIN COMPETITIVE;

-- THE EQUALLY IMPORTANT INTERESTS OF THE U.S. COMMERCIAL SPACE LAUNCH INDUSTRY, WHICH FACES THE THREAT OF GOVERNMENT-SUBSIDIZED INTERNATIONAL COMPETITION;

-- AND, NOT LEAST, OUR COUNTRY'S FOREIGN POLICY AND INTERNATIONAL RELATIONS INTERESTS.

MR. CHAIRMAN, I LOOK FORWARD TO THE TESTIMONY OF THE VARIOUS PANELS AND WITNESSES WHO ARE HERE TODAY TO HELP THIS COMMITTEE EXAMINE THIS ISSUE.

STATEMENT BY CONGRESSMAN DAVID SKAGGS
ON THE LONG MARCH LICENSE
September 23, 1988

China has offered its Long March 3 (CZ-3) for the launch of Western communications satellites for several years without success. Several recent developments, however, indicate China may finally penetrate this market through predatory pricing. That is very unfortunate.

Not so long ago, this Committee unanimously passed a bill -- authored by Mr. Nelson and cosponsored by many of us -- that was designed to help our domestic launch industry take flight again. Since that time, and since the President announced his new National Space Policy to "encourage the U.S. private sector development of commercial launch operations", our domestic launch industry has in fact responded by making plans and investing millions of dollars into this difficult and risky business.

This is no time to be pulling the rug our from under our rejuvenated commercial launch industry. To aid and abet the Chinese in undermining this critical domestic industry just makes no sense. For that reason, I've joined Representative Gerald Solomon in support of his Joint Resolution to disapprove this license.

American launch companies can't compete against a foreign program that is subsidized to the tune of tens of millions of dollars, a program that can underbid any Western launch company on almost any contract at any time because it doesn't have to respond to normal pricing practices. Nor has China yet agree to key liability responsibilies that Western launch operators must.

Let me summarize four key reasons why the use of Chinese launch vehicles to launch Western satellites is against our national interest:

1. American launch companies cannot compete against a foreign government program totally independent of free market pressures. Chinese foreign exchange needs and foreign policy considerations outrank profit requirements in Long March pricing decisions. Consequently, Chinese launch prices offered are 20% to 70% of Western prices.

2. Driving American launch operators out of business is antithetical to the objectives of the new National Space Policy. Instead of a robust national aset generating hundreds of millions of dollars in overseas revenue annually, the U.S. launch industry could become so weak that even American satellite operators could become dependent on foreign launch vehicles.

3. U.S. satellite technology should not be compromised. American companies build the most advanced communications satellites in the world, and the communications and systems integration technologies used in these are critical national assets.

4. China must accept financial responsibility for its launches. Until China provides enforceable assurances that its potential launch liabilities are covered, it is not an acceptable entrant into the commercial launch market.

To sum up, everybody has to play by the same set of rules, or we might as well tell our American launch companies to forget it. This is the wrong decision at the wrong time for the wrong reason. I hope my colleagues will rally around the flag on this one during the brief time we have left this year to take action.

The **Chairman**. If there are no further opening statements, the Chair would recognize our first panel.

May the Chair suggest to the folks that are participating today that we have four, five panels going to testify and the first panel, of course, is going to include Mr. Eugene McAllister, who's the Assistant Secretary for Economic and Business Affairs, the Department of State. He is accompanied in this panel by Mr. Karl Jackson, who is the Deputy Assistant Secretary of Defense for East Asian and Pacific Affairs.

May I again reiterate to the members that were not here at the very beginning that Secretary Carlucci will be briefing the Committee next Tuesday between 9:15 and 10:15 and that part will be a closed hearing to go into some of the Defense and the security issues, so I don't know whether we want to go in too much depth with Dr. Jackson viz-a-viz, those issues, because some of them are classified.

Now having said that, the Chair would welcome our two witnesses, and suppose we defer first to Mr. McAllister for his statement.

STATEMENT OF MR. EUGENE McALLISTER, ASSISTANT SECRETARY FOR ECONOMIC AND BUSINESS AFFAIRS, DEPARTMENT OF STATE, ACCOMPANIED BY MR. J. STAPLETON ROY, DEPUTY ASSISTANT SECRETARY OF STATE FOR EAST ASIAN AND PACIFIC AFFAIRS, DEPARTMENT OF STATE; AND MR. KARL JACKSON, DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR INTERNATIONAL SECURITY AFFAIRS, DEPARTMENT OF DEFENSE.

Mr. **McAllister**. Mr. Chairman, members of the Committee, thank you very much for the opportunity to testify before the Committee this morning on the recent decisions regarding the licensing of U.S.-made satellites to be launched on Chinese ELVs.

I am Eugene McAllister, Assistant Secretary of State and on my left is Stapleton Roy, Deputy Assistant Secretary of State for East Asian and Pacific Affairs.

On September 12 the State Department notified Congress of the Administration's intent to approve, subject to certain conditions, a license application for the launch of two Hughes satellites by the Australian telecommunications firm AUSSAT on Chinese ELVs. We also notified Congress of our intent to approve, subject to the same conditions, a license application of a third U.S.- made satellite, AsiaSat, on behalf of a Hong Kong consortium with PRC and British ownership. AsiaSat will also be launched using a Chinese ELV. COCOM concurrence will be required for all three licenses.

These were difficult decisions for the Administration and during the process we grappled with two major concerns—the first, whether this technology we were contemplating exporting was too sensitive on national security grounds and if we did export it if we could protect it, and two, the effect of the Chinese entering the commercial launch business upon our own commercial launch providers.

The question was not so much the introductory rates the PRC was offering, because the Europeans have offered even lower introductory prices, but whether we could address the longer term question of how do we ensure that our domestic commercial launch industry is protected from possible unfair subsidies from a nonmarket economy.

We grappled with these issues in a larger context, which is the PRC's effort to develop a commercial launch industry for technological reasons and reasons of national prestige. This should be considered in light of our growing economic and trade relationship with the PRC and our desire to build a stable political relationship with the Chinese, and two, the importance of technology to the U.S. economy. This includes of course the technology involved in commercial space launches but also satellite technology, where the U.S. is clearly the world leader.

The Administration believes that the first two considerations, exporting technology and the entry of the PRC in the launch market, can be successfully addressed and they can be addressed by three conditions we have established before we will license the technology.

The first is the completion of a government-to- government agreement that would establish a satisfactory technology safeguard regime. In other words, our national security concerns will be protected.

Second, a government-to-government agreement that China will compensate the U.S. for any and all amounts for which the U.S. may be liable under international law in case of an accident.

Third, a government-to-government agreement that will prevent possible unfair Chinese pricing or trade practices from adversely affecting our private commercial launch industry.

Again let me emphasize the difficulty of this decision but let me also note that these three license applications are just the tip of an iceberg. Even if we turn town these applications, the issue of commercial launches on Chinese ELVs will not disappear.

In accepting these applications the United States will be in a better position to (1) set the technology safeguards standard for satellite sales to the PRC; and (2) ensure a level playing field for the domestic space launch industry.

I am going to give you an example. If these were British satellites the U.S. would have the opportunity in a sense to veto the licenses in COCOM if we believed the technology was sensitive and could not be protected. However, we will not necessarily have the opportunity to establish as a pre-condition the negotiation of a U.S. PRC agreement on launch practices.

If the satellites were Brazilian, we would not have the opportunity to veto the sale, nor would we have the opportunity to establish a fair trade agreement as a pre- condition.

I might also note that even with the agreements the U.S. will continue to review export license applications for payloads to be launched on the Chinese ELVs on a case-by-case basis.

Again, while a difficult decision, the licensing of these applications provides a much greater opportunity for the U.S. to set the stage for this new field of international competition than if another country were to license or to sell the satellites.

Let me also take a minute to talk about the larger context which Stapleton Roy or Karl Jackson can elaborate on.

This is part of an effort over the past decade to build a stable relationship with China. Both Republican and Democratic Administrations with bi-partisan support from Congress have encouraged the expansion of trade, investment, and scientific ties. This aspect of our relationship has experienced enormous growth in recent years to the benefit of both sides.

Two-way trade increased from $1 billion in 1979 to over $10 billion in 1987. Exports to China in 1987 exceeded $3.5 billion. The U.S. is the third largest investor in China, with about $2 billion in assets. We also have our largest programs in scientific and technology exchanges with China, as the Chairman noted. Hundreds of scientific and technical delegations have travelled between the two countries and over 30,000 Chinese students are studying in the United States.

High tech trade is also a part of our economic relationship and part of the larger picture. Over the past five years the United States has supplied between 30 and 47 of China's total high tech imports.

An area of high tech trading in which the United States is particularly competitive is satellites. The U.S. is expected to build over 60 percent of the free world's communications satellites in the next five years, earning more than $2.5 billion in export revenues.

We are facing increased competition from abroad. Allowing the U.S. firms to use the most price competitive launches enables them to compete with other countries' satellites and technologies. Even the two satellites under question are significant. Goods and services purchased in the U.S. and abroad associated with AsiaSat will be about $40 million in value. For the AUSSAT satellite that figure is approximately $250 million. In other words we have $300 million in exports at stake.

Finally, let me address the question of timing. We are very aware that this session of Congress is coming to a close and this decision may seem to have been dropped on Congress at the last minute.

The Executive Branch received these applications in mid-July. We were concerned that if we delayed a decision it would jeopardize $300 million in exports.

We also recognized the importance of these applications and that the law only calls for 30 days notification of Congress and now 30 working days.

We wanted to provide Congress as much time as possible to review these applications, as many working days as possible. We went through an expedited process. We tried to be prompt but not hasty in reviewing these applications and that is why we were only able to notify you on September 12. With that, let me conclude my statement.

[The prepared statement of Mr. Eugene McAllister follows:]

STATEMENT

OF

EUGENE J. MCALLISTER

ASSISTANT SECRETARY

BUREAU OF ECONOMIC AND BUSINESS AFFAIRS
DEPARTMENT OF STATE

BEFORE THE

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

Washington, D.C.

September 23, 1988

Mr. Chairman and Members of the Committee:

I would like to thank you for inviting me to testify before this committee today. My name is Eugene J. McAllister. I am the Assistant Secretary for the Bureau of Economic and Business Affairs in the Department of State.

I am here today to discuss the Administration's recent decision regarding the use of Chinese launch services. On September 12, the State Department notified Congress of the Administration's intent to approve, subject to certain conditions, a pending export license application for the use of Chinese space launch services. The license application was submitted by Hughes Aircraft Company for the launch of two of its satellites which have been ordered by an Australian telecommunications entity, AUSSAT.

The Administration also decided to approve, subject to these same conditions, a license for the launch of a third U.S.-made satellite on a Chinese launch vehicle. This satellite, known as AsiaSat, will be launched on behalf of a Hong-Kong-based consortium with PRC and British ownership. The Congress has also been informed of the Administration's decision regarding the AsiaSat license even though the export involved is for less than the $50 million threshold for notification specified in the Arms Export Control Act. COCOM concurrence will be required for all these licenses.

If these licenses are issued, after Congressional review and COCOM concurrence, they will be the first ever approved by the U.S. Government for shipment of U.S.-made satellites to a non-western destination. The U.S. has previously licensed export of U.S.-built satellites only to one foreign destination -- France -- for launch on the Ariane launch vehicle.

It is important to emphasize that final approval of the license applications will be contingent on the Peoples Republic of China satisfying three preconditions. The U.S. and the PRC will establish a government-to-government agreement to safeguard U.S. technology from possible appropriation, misuse or diversion, and the U.S. will negotiate a government-to-government agreement that China will compensate the U.S. for any and all amounts for which the U.S. may be liable under international law in case of accident. The Administration also has decided that we will have an agreement to prevent possible unfair Chinese pricing or trade practices relating to launch competition.

I will discuss these preconditions, as well as how the Administration intends to ensure that they are met, in some detail later in my testimony. I wish to turn first to the process culminating in the Administration's decision.

The Decision-making Process

U.S. policy with regard to China is to evaluate such exports on a case-by-case basis, with a presumption of approval provided that our national security concerns can be met. In the past, avionics upgrades for the F-8 fighter aircraft were approved through FMS channels, and the U.S. has also approved export license applications for military helicopters, anti-tank weapons, co-production of commercial aircraft, and advanced mainframe computers. With regards to satellites, the U.S. already has approved export to China of interface data as well as one of the most sensitive components, the traveling wave tubes. As a matter of policy, the U.S. Government will continue its case-by-case approach to decisions on future export license requests for satellites destined for launch by the PRC.

The decision on licensing satellites for use by China is consistent with overall U.S. export control policy. The U.S. has a clearly differentiated policy on export controls for China. This policy is set down in regulation, and is accepted within COCOM. As a "friendly, non-aligned" nation, China is authorized to receive far more sophisticated technology than other proscribed countries. For example, we permit the export of computers roughly ten times more powerful to the PRC than to the USSR.

On July 13 and July 15, the State Department's Office of Munitions Control received two separate export license applications relating to the sale of U.S.-manufactured telecommunications satellites to AUSSAT and AsiaSat for launch on the Chinese Long March vehicles. These applications were filed by Hughes Aircraft Company for the AUSSAT satellites and by counsel for the AsiaSat consortium. The Department of State, through its Office of Munitions Control, has licensing authority.

Concurrent with the receipt of the export license applications, several senior interagency groups were convened under the auspices of the National Security Council and the Economic Policy Council to examine the various dimensions of this complex issue. These dimensions included: technology transfer, foreign policy and space policy, national security, and economic and trade policy.

These groups provided background and identified options, which were then integrated in a lengthy decision memorandum for Cabinet consideration. The EPC, expanded to include other interested agencies, met September 7, and forwarded the issue to the President. The State Department notified Congress of the Administration's decision on September 12.

Section 36 (c) of the Arms Export Control Act requires the Administration to notify Congress before issuing a license for an item on the U.S. Munitions List that is sold under contract for $50 million or more. The Administration notified Congress of its decision with regard to the AUSSAT license since the value of that proposed export exceeds $50 million ($260 million). In an effort to keep Congress fully informed of related developments, the Administration also informed Congress of its intent to approve the AsiaSat license, even though this proposed export is for less than $50 million.

Time-sensitivity Factors

Congress' schedule was a significant factor in the timing of the Administration's decision. The Administration sought to provide Congress with the maximum number of session days to consider the decision.

In addition to Congress' schedule, other factors drove the Administration to move quickly. AUSSAT required launch vehicle selection by September 30, 1988 and a signed contract by October, 1988 in order to provide uninterrupted service to its customers. There is a lead time for building and launching satellites of some 33 months. In addition, the consortium purchasing AsiaSat, scheduled for launch in late 1989/early 1990, required an early decision in order to take legal ownership of the satellite and begin the satellite's 18-month refurbishment. The consortium's marketing plan for finding satellite customers was also held up pending a decision.

By delaying our decision, the U.S. Government could have jeopardized some $300 million in U.S. exports, as well as American jobs. In AUSSAT's case, AUSSAT would need to find another solution to its satellite problem, including looking to a non-U.S. satellite. A European consortium (British Aerospace/Matra) had been the runner-up to Hughes in the AUSSAT procurement. In the case of AsiaSat, the entire venture could collapse because the Chinese partner and Chinese customers of AsiaSat are receiving access to foreign exchange needed for their participation on the basis of PRC foreign exchange earnings from the launch.

What are AsiaSat and AUSSAT?

I realize that I have been using the names "AsiaSat" and "AUSSAT" throughout my testimony without fully explaining what these entities are, and what services the satellites under consideration will provide.

First, I should mention that none of the satellites under consideration are military satellites.

With regards to AsiaSat, the consortium that owns the AsiaSat satellite is based in Hong Kong. The three partners in this consortium are: the British telecommunications firm, Cable & Wireless PLC; Hutchison Telecommunications Ltd, a trade and investment house based in Hong Kong; and CITIC Technology Corporation, a quasi-private PRC company. The three partners each hold a one-third equity interest.

The AsiaSat satellite, originally named WESTAR VI, was manufactured by Hughes Aircraft and launched by the Space Shuttle. It failed to reach geosynchronous orbit and was recovered from space by the Shuttle in 1984. The satellite will be modified and refurbished for AsiaSat use at a Hughes plant in California.

AsiaSat will provide telecommunications service in China, including Hong Kong and Macau, and Pakistan, Thailand, Burma, Nepal, Bangladesh and Korea. It may also provide television service in Pakistan, although that awaits final negotiation. The projected launch date for AsiaSat is late 1989/early 1990.

AUSSAT is an Australian quasi-governmental telecommunications company. AUSSAT currently operates two AUSSAT A satellites (also built by Hughes Aircraft). These two aging satellites are to be replaced by the two satellites under consideration, the AUSSAT B satellites. The AUSSAT B satellites will provide a variety of services including telecommunications and television services. The projected launch dates for the two AUSSAT satellites are 1991 and 1992.

The Conditions

The Administration reached this decision only after having considered foreign policy and national security concerns. We are determined to protect legitimate U.S. national security interests, and to ensure the ability of the U.S. commercial launch industry to compete on an equal footing with launches from a non-market economy. The Administration reaffirms its policy of promoting and encouraging a strong U.S. commercial launch industry.

Technology Safeguard Agreement. Both of the applicants for these licenses proposed comprehensive safeguards to protect sensitive satellite technology while the satellites are in China. These safeguards include strict controls on the access

Chinese personnel will have to the satellites while in country; the existence of secure payload handling facilities built by the Chinese for commercial use; and detailed procedures attempting to minimize foreign access to sensitive technical information and hardware.

As an essential additional measure of assurance, the U.S. has conditioned the actual issuance of the export license to several preconditions, one of which is formal government-to-government agreement on the technology safeguard regime which must be in place before the satellites are shipped from the U.S. The State Department, with participation from other agencies, will lead negotiations with the PRC on this issue.

Liability Responsibility. The United States will negotiate a government-to-government agreement providing that China will compensate the U.S. for any and all amounts for which the U.S. may be liable under international law, in the case of accident. This assurance is considered advisable because China is not a party to the UN Convention on International Liability for Damage Caused by Space Objects ("the Liability Convention"). Under the Liability Convention, if it could be demonstrated that the U.S. procured the launches in question, the U.S. could be considered a "launching state" of the satellites. Launching states have broad potential liability under the Convention for damage caused by objects they have launched, including absolute liability for damage caused on the surface of the earth or to aircraft in flight.

If China were a party to the Convention, the U.S. could seek indemnification from China for liability that might fall on the U.S. as a result of its being considered a "launching state." Because, however, China is not a party to the Convention, the U.S. could potentially be solely liable for damage caused by the accident. We therefore seek an agreement providing that China would compensate the U.S. for any such liability. The State Department, again with other agency participation, will lead the negotiations on this issue.

Preventing Unfair Trade Practices. The Administration also has decided that we will have an agreement to prevent possible unfair Chinese pricing or trade practices relating to launch competitions. In making this decision, the Administration wishes to protect the interests of the U.S. commercial launch industry in regard to possibly unfair Chinese pricing and trade practices. We are convinced that our domestic launch industry can compete very effectively internationally as long as the playing field is level. While we note Chinese statements that the pricing of the launches in question are at promotional rates -- a practice engaged in by other launching states -- we will require adequate assurances from the Chinese Government that future launch competition will not be conducted in a manner that unfairly disrupts this market.

The pending license requests will not be approved until we have reached satisfactory agreement with the Chinese on measures to assure fair competition. The United States Trade Representative, with participation from other agencies, will lead the negotiations with the Chinese.

Although we anticipate reaching agreement relatively quickly on these conditions, there are a number of obstacles which must be overcome. One of these is the difficulty of judging true costs of production in a non-market economy.

Chinese Readiness to Enter into Negotiations

We will hold up actually issuing the licenses until all three agreements are obtained from the Chinese. The Chinese government has affirmed that it is prepared to hold comprehensive discussions on its satellite launch policies with us at a mutually convenient time.

COCOM

The AUSSAT and AsiaSat export license applications will be submitted to COCOM, the Coordinating Committee on Multilateral Export Controls, for review after the 30-day Congressional review period. COCOM concurrence, which must be unanimous, is required before the U.S. Government can issue the license. The case will be handled on a four week time clock, standard procedure for PRC industrial list cases.

In seeking their concurrence, the U.S. has made clear to its COCOM allies that final approval of the license applications is contingent upon Chinese agreement to stringent safeguards to protect sensitive COCOM-controlled technology. The U.S. also made clear that its decision is consistent with COCOM's longstanding policy of differentiation between the PRC and the Soviet Union. We are continuing to consult with our COCOM partners to explain our position and address any remaining concerns they may have. We also have informed members of the European Space Agency, with whom we have held "rules of the road" talks since June, 1987, of our decision. Further consultations are expected later this month (September 28).

The Soviet Question

Since the Administration first announced its decision, we have been asked whether this decision also signals a change in U.S. policy toward the Soviet Union. I wish to emphasize in the strongest possible terms that this decision does not reflect a change in U.S. policy opposing use of Soviet launch vehicles. As a matter of law and policy, we distinguish between the Soviet Union and the PRC with regard to approval of licenses for the export of satellites. In the case of the USSR, such exports are prohibited, while in the case of the PRC, decisions are made on a case-by-case basis. This distinction is based on a number of considerations, including the technical capability and incentives for the USSR to attempt to exploit advanced U.S. technology in this area. This distinction exists both under domestic U.S. law (the International Traffic in Arms Regulations) and in COCOM.

Impact on U.S. - PRC Relations

Over the past few months, the Chinese Government has underscored on a number of occasions the importance which it attaches to the licensing of U.S. commercial satellites to China. Senior officials raised it with Secretary Shultz during his trip to China in July and again with Secretary Carlucci in his visit earlier in September. For China, entry into the international satellite launch market represents an important national initiative in high technology trade and an opportunity to earn much-needed foreign exchange.

As part of an effort over the past decade to build a stable, mature and multi-faceted relationship with China, both Republican and Democratic administrations, with bi-partisan support from the Congress, have encouraged the expansion of trade, investment and scientific ties. This aspect of our relationship has experienced enormous growth in recent years, to the benefit of both sides. Two-way trade increased from about $1 billion in 1979 to over $10 billion in 1987. Exports to China in 1987 exceeded $3.5 billion. The U.S. is the third largest investor in China, with about $2 billion in assets. We have our largest program of science and technology exchanges with China. Hundreds of scientific and technical delegations have traveled between the two countries, and over 30,000 Chinese students are studying in the U.S., a large number in scientific and technical fields, under official and unofficial sponsorship.

High technology trade has become particularly important in our economic relationship. Over the past five years, the U.S. has supplied anywhere from 30 percent to 47 percent of China's total high technology imports. The market for high technology products in China is large and will continue to grow as China proceeds with its ambitious program of economic modernization in the years ahead. It is in our interest to be able to compete effectively in the Chinese high technology market so long as in doing so we can ensure the protection of sensitive technology from misuse or diversion.

Advantages of License Approval for the U.S.

We believe that, provided our preconditions are met, these exports are consistent with our foreign policy and national security objectives. In addition to conferring important benefits on the U.S. satellite industry and the U.S. economy, the way the preconditions have been structured will create safeguards for our launch industry against possible unfair Chinese competition.

U.S. Satellite Industry and Economy. The U.S. commercial satellite industry is expected to build over 60 per cent of the free world's communications satellites over the next five years, providing in excess of $2.5 billion in export revenue. U.S. satellite manufacturers face increasing competition from European (and soon Japanese) firms. For example, the runner-up to Hughes in the AUSSAT competition was the European team, British Aerospace/Matra. Permitting U.S. firms to use cost competitive launchers allows them to remain competitive vis-a-vis both foreign satellite firms and terrestrial competitors such as fiber optics.

The value of U.S. goods and services associated with the AsiaSat export is approximately $40 million. This export would probably be lost if the license is not approved. As I mentioned previously, the commercial viability of the AsiaSat consortium depends on the Chinese partner's access to foreign exchange provided by the Long March launch contract.

The contract between Hughes and Australia calls for the design, manufacture, test and delivery in orbit of two satellites on the Chinese Long March launch vehicle. The contract value, including the two Chinese launches and insurance, is for $260 million.

Approximately $250 million will be spent in the United States by Hughes and its major subcontractors under the proposed contract. This translates roughly into some 2250 man-years of effort. Spread over a three-year period of time, the effort equates to an average of 750 jobs per year. The list of potential major subcontractors shows that localities from Niagara Falls to Albuquerque, from Newark, Delaware to El Monte, California stand to benefit.

It is highly likely that AUSSAT will exercise an option to buy a third satellite in the next two years. The value of this option will be approximately $100 million, excluding launches and insurance, meaning still more American jobs.

Were the license application to be denied, AUSSAT would have to choose an alternate supplier of either the satellites or the launch services. In either case, foreign firms may well be the beneficiaries, rather than American ones.

U.S. ELV Industry. The Chinese will enter the international market for launch services with or without U.S. approval, since we do not have a monopoly on satellite production. Conditioning the license on reaching agreement to prevent possible unfair Chinese practices helps ensure that Chinese competition will be fair.

The conditions we seek will stipulate appropriate Chinese behavior with respect to the entire international market, not simply that portion relating to U.S.-made satellites.

Allowing limited competition now will strengthen our industry before other nations enter the launch services market later in the 1990's.

One final note, while the Chinese launch services question was one that the Administration could have postponed, we would have had to face it eventually. The benefit of facing it now is that we face it on our terms, with our preconditions and leverage for negotiating a strong trade agreement. If we do not export a U.S.-made satellite, others are waiting in the wings. The U.S. has far less leverage, none in the case of non-COCOM countries, to control the export of foreign-made satellites.

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United States Senate
COMMITTEE ON FOREIGN RELATIONS
WASHINGTON, DC 20510-6225

September 22, 1988

The Honorable George P. Shultz
Secretary of State
Washington, D.C. 20520

Dear Mr. Secretary:

On September 12th the Administration notified the Congress of its intention to license the export of Hughes HS-601 commercial communication satellites for launch by Chinese space launch vehicles. The notification conditioned the export license upon the satisfactory conclusion of three agreements -- one involving a government-to-government regime to safeguard the technology, another ensuring that China will accept adequate responsibility for liability for damages or accident, and a third regarding measures to prevent possible unfair Chinese pricing or trade practices relating to launch competitions.

In order to make a judgment on the advisability of this sale, the Committee will need responses to the following questions regarding the three agreements under negotiation.

(1) In case of a malfunction upon launch, what assurances will be given the United States concerning prompt access to and recovery of a satellite or satellite parts that may fall on Chinese territory?

(2) What are the physical security arrangements from the time the satellites arrive in China until the time of launch?

(3) What is the Administration's evaluation of the potential for technology loss due to requirements for interfacing the satellites and the launchers, and by Chinese observation of satellite specifications and systems integration?

(4) Is the Administration prepared to provide a firm assurance, as it did orally at a briefing to Committee staff on September 15, that the very low "introductory price" for the launch of these satellites is a one-time approval, and that any subsequent Chinese launch offer will be reviewed

on a fair price basis, excluding any consideration of "introductory prices"?

(5) How does the Administration plan to ensure that unfair Chinese pricing will not damage U.S. launch industries in the future? Since cost comparisons appear invalid in most cases, what specific arrangements, such as imputed costs or quotas, are planned? Specifics of this agreement are especially significant because of widespread belief that the Chinese launch price is artificially low.

(6) What are the risks that U.S. approval of this case will encourage the Chinese launch industry to develop larger boosters accommodating larger payloads, thereby contributing to its nuclear weapons delivery capability?

In addition, it would be helpful to have draft texts of the three agreements. Finally, if these agreements have not been concluded prior to the expiration of the 30-day period provided for Congressional action, it will be critical for the Committee to have firm assurances as to what specific requirements the Administration will insist on prior to granting an export license.

In view of the short time remaining for Congressional consideration of this matter, I would appreciate having a response by Friday, September 30.

With every good wish.

Ever sincerely,

Claiborne Pell
Chairman

The CHAIRMAN. I thank the distinguished Secretary. Your statement without objection will appear in full in the record. The Chair recognizes Dr. Jackson, Deputy Assistant Secretary of Defense, East Asia and Pacific Affairs.

Mr. JACKSON. Thank you, Mr. Chairman.

I assume that all members of the Committee know that my boss, Secretary of Defense Carlucci, will appear before you in a closed session tomorrow morning.

The CHAIRMAN. Tuesday morning.

Mr. JACKSON. I'm sorry; Tuesday morning. I understand that the Committee also will take my written statement and make it a part of the record and in order to save time, I thought I would just elaborate on it.

The CHAIRMAN. With no objection, so ordered.

Mr. JACKSON. I would only make three additions to my prepared statement. First of all, DOD along with all other agencies agreed that there are no tech transfer problems that cannot be managed by a stringent safeguards agreement. This agreement has yet to be negotiated with China but the licenses for the three satellites will not go forward until such a stringent agreement has been negotiated.

Secondly, case-by-case approval is still the order of the day. If Congress does not like the conditions that we negotiate with China with regard to these three licenses, or if the U.S. Government finds something in Chinese behavior that is remiss, obviously this will have an impact on subsequent license decisions.

The third point I would like to make is that the President's decision on the export licenses took place at the end of a very successful visit to China by Secretary Carlucci. During that visit, we had very successful and satisfying discussions with China on a number of issues of great importance to the United States.

The Department of Defense believes that the overall U.S./China relationship will benefit from these three satellites being launched on the Chinese Long March rocket.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Karl Jackson follows:]

LICENSING EXPORT OF COMMERCIAL SATELLITES TO THE PEOPLE'S REPUBLIC OF CHINA

STATEMENT OF DR. KARL D. JACKSON
DEPUTY ASSISTANT SECRETARY OF DEFENSE
(EAST ASIA AND PACIFIC AFFAIRS)

BEFORE THE

COMMITTEE ON SPACE, SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

23 SEPTEMBER 1988

DEPARTMENT OF DEFENSE INVOLVEMENT IN THE CHINA COMMERCIAL SPACE LAUNCH ISSUE DATES BACK TO FORMER SECRETARY OF DEFENSE CASPAR WEINBERGER'S OCTOBER 1986 VISIT TO CHINA. DURING THAT VISIT, SECRETARY WEINBERGER VISITED CHINA'S SPACE LAUNCH FACILITY AT XICHANG IN SICHUAN PROVINCE. ALSO AT THAT TIME, FORMER MINISTER OF DEFENSE ZHANG AIPING ASKED MR. WEINBERGER FOR HIS SUPPORT OF A PENDING LICENSE FOR THE LAUNCH OF A WESTERN UNION SATELLITE (WESTAR VI) IN CHINA. MR. WEINBERGER TOLD THE CHINESE THAT HE WOULD SUPPORT APPROVAL OF THE WESTAR VI APPLICATION SO LONG AS ADEQUATE SAFEGUARDS WERE PROVIDED FOR U.S. TECHNOLOGY. HE ALSO INFORMED THE CHINESE THAT THE U.S. WOULD CONTINUE TO REVIEW LICENSES FOR FOREIGN LAUNCH OF U.S. MANUFACTURED SATELLITES ON A CASE-BY-CASE BASIS TO INCLUDE REVIEW BY COCOM.

CERTAINLY, THE SATELLITE EXPORT LICENSES NOW BEFORE US WERE A SUBJECT OF DISCUSSION DURING SECRETARY CARLUCCI'S RECENT VISIT TO CHINA. THE CHINESE REMINDED US OF THE DISCUSSIONS WHICH TOOK PLACE DURING SECRETARY WINBERGER'S VISIT TO CHINA AND MADE IT CLEAR THAT THEY PLACE GREAT IMPORTANCE ON THEIR ABILITY TO PARTICIPATE IN THIS INTERNATIONAL MARKET.

THE DEPARTMENT OF DEFENSE ACTIVELY PARTICIPATED IN THE DECISION-MAKING PROCESS WHICH LED TO A RECOMMENDATION TO THE PRESIDENT. SECRETARY CARLUCCI PERSONALLY APPROVED THE DEPARTMENT OF DEFENSE POSITION. FOLLOWING THE PRESIDENT'S DECISION, CONGRESS WAS NOTIFIED OF HIS INTENT TO APPROVE THE SATELLITE EXPORT LICENSES SUBJECT TO CERTAIN CONDITIONS. WE BELIEVE THAT APPROVAL OF THESE LICENSES WITH THE CONDITIONS SPECIFIED IN THE PRESIDENT'S DECISION IS IN THE BEST INTEREST OF THE UNITED STATES.

AS BEFORE, OUR INTEREST IN THE CHINA COMMERCIAL SPACE LAUNCH ISSUE REVOLVES AROUND TWO PRIMARY CONSIDERATIONS; FIRST, THE

PROTECTION OF SENSITIVE U.S. TECHNOLOGIES WITH POTENTIAL MILITARY APPLICATIONS AND SECOND, THE RELATIONSHIP OF THIS ISSUE TO THE MILITARY AND OVERALL U.S.-CHINA RELATIONSHIPS.

WITH REGARD TO THE ISSUE OF PROTECTING SENSITIVE U.S. TECHNOLOGIES FOR THE TWO AUSSAT AND ASIASAT SATELLITES CURRENTLY BEFORE THE CONGRESS, WE HAVE DETERMINED THAT A GOVERNMENT-TO-GOVERNMENT AGREEMENT ON TECHNOLOGY SAFEGUARDS FOR SATELLITE LAUNCHES IN CHINA WILL PROVIDE ADEQUATE PROTECTION FOR U.S. TECHNOLOGY. THE CHINESE HAVE INDICATED THEIR WILLINGNESS TO ENTER INTO SUCH AN AGREEMENT. THE ACTUAL ISSUANCE OF THE LICENSE IS DEPENDENT UPON AN AGREED SAFEGUARD REGIME BEING IN PLACE BEFORE THE SATELLITES ARE SHIPPED FROM THE U.S.

SAFEGUARDS PROPOSED BY THE LICENSE APPLICANTS FOR THE SATELLITES WHILE IN CHINA INCLUDE STRICT CONTROL OVER ACCESS CHINESE PERSONNEL WILL HAVE; THE EXISTENCE OF DEDICATED, SECURE PAYLOAD HANDLING FACILITIES; AND DETAILED PROCEDURES TO MINIMIZE FOREIGN ACCESS TO SENSITIVE TECHNICAL INFORMATION AND HARDWARE.

CONCERNING THE RELEVANCE OF THIS ISSUE TO THE BILATERAL MILITARY AND OVERALL U.S.-CHINA RELATIONSHIPS, APPROVAL OF THESE LICENSES AND CHINA'S ENTRY INTO THE FOREIGN COMMERCIAL SPACE LAUNCH MARKET IS CONSISTENT WITH FUNDAMENTAL U.S. GOALS AND OBJECTIVES FOR CHINA. OUR OBJECTIVE REMAINS TO ENCOURAGE GREATER PARTICIPATION BY CHINA IN WESTERN ECONOMIC ENDEAVORS. SUCH PARTICIPATION INCREASES THE STAKE CHINA HAS IN PURSUING AND COORDINATING POLICIES THAT SUPPORT RATHER THAN DISRUPT GLOBAL AND REGIONAL STABILITY. ENTRY INTO THE COMMERCIAL SPACE FIELD WILL ALSO FOSTER EFFORTS TO DIRECT CHINA'S MISSILE AND SPACE ACTIVITES INTO AREAS MORE COMPATIBLE WITH OUR OWN NON-PROLIFERATION CONCERNS AND OBJECTIVES.

SOME HAVE RAISED THE SPECTER OF SOVIET ENTRY INTO THE COMMERCIAL SPACE LAUNCH MARKET AND ARGUE THAT APPROVING THESE LICENSES WILL CONTRIBUTE TO THAT EVENTUALITY. WE DO NOT AGREE

THAT THIS IS THE CASE. GLASNOST AND PERESTROIKA NOTWITHSTANDING, OUR POLICY TOWARD THE SOVIET UNION IS QUITE DIFFERENT FROM OUR POLICY TOWARD CHINA.

IT MUST BE KEPT IN MIND THAT CHINA IS A FRIENDLY NON-ALLIED COUNTRY WITH WHICH WE SEEK AN ENDURING RELATIONSHIP AND INCREASING INTERACTION ON POLITICAL, ECONOMIC, AND SECURITY MATTERS. THE UNITED STATES HAS SIGNIFICANTLY LIBERALIZED ITS POLICY WITH REGARD TO TECHNOLOGY TRANSFER TO CHINA OVER THE PAST FIVE YEARS. AS PART OF OUR DEVELOPING MILITARY RELATIONSHIP WITH CHINA, WE HAVE TRANSFERRED WEAPONS AND EQUIPMENT EMBODYING MILITARY TECHNOLOGIES THAT ARE IN SOME INSTANCES MORE ADVANCED THAN THOSE TO BE FOUND IN THE SATELLITES IN QUESTION. FURTHERMORE, MANY OF THE TECHNOLOGIES EMBODIED IN THE SATELLITES WHICH WILL BE LAUNCHED IN CHINA HAVE ALREADY BEEN SOLD OR RELEASED TO CHINA VIA COMMERCIAL CHANNELS.

OUR CONCLUSION, BASED ON A THOROUGH REVIEW OF THE EVIDENCE, IS THAT CHINA'S ENTRY INTO THE FOREIGN COMMERCIAL SPACE LAUNCH INDUSTRY WILL PROVIDE NO ADDITIONAL IMPETUS TO THE DEVELOPMENT OF CHINA'S MILITARY CAPABILITIES TO INCLUDE ITS CAPABILITIES IN SPACE.

FINALLY, WE RECOGNIZE THAT A VIABLE U.S. SPACE LAUNCH INDUSTRY IS IN THE NATIONAL SECURITY INTEREST OF THE UNITED STATES. THE EXPENDABLE LAUNCH VEHICLE INDUSTRY IS AN IMPORTANT ELEMENT OF OUR STRATEGY FOR MAINTAINING OUR CAPABILITIES IN SPACE WHICH CONTRIBUTE TO THE NATIONAL DEFENSE. WHILE SPECIFIC TRADE AND FAIR COMPETITION ISSUES ARE MATTERS TO BE ADDRESSED BY OTHERS, WE DO NOT AGREE THAT CHINA'S LIMITED ENTRY INTO THIS MARKET PLACE WILL CAUSE SEVERE OR PERMANENT DAMAGE TO THAT DEVELOPING U.S. INDUSTRY. WE WOULD HOPE THAT FAIR COMPETITION BY CHINA WOULD BENEFIT ALL.

The CHAIRMAN. I thank the distinguished gentleman. Does Mr. Roy have anything he wishes to add at this point?

Mr. ROY. Mr. Chairman, Assistant Secretary McAllister has accurately reflected the views of the Department of State and in the interest of time, I do not have a statement of my own.

The CHAIRMAN. I thank the distinguished gentleman.

I think what we will do when we have our questioning, we will have to revert to the five minute rule simply because of the length of the hearing today and the number of witnesses. We want everybody to be able to be heard today.

If the members would please adhere to that regulation, it will give us a chance to have everybody participate as we go.

The Chair would only like to reiterate for the record or at least sum up on one issue. The two satellites in question will be owned by the Australian Government or one of their companies, an Australian company; is that not correct?

Mr. MCALLISTER. Yes, sir.

The CHAIRMAN. The third satellite as I understand it, the Asia-Sat; correct? That would be owned by the British, by a consortium, as you indicated in your statement, by the People's Republic of China, British ownership and also Hong Kong. Is that not correct?

Mr. MCALLISTER. Yes, sir.

The CHAIRMAN. Therefore, the satellites per se are owned by other entities in other countries?

Mr. MCALLISTER. That is correct, Mr. Chairman.

The CHAIRMAN. The Chair recognizes the distinguished gentleman from New Mexico, Mr. Lujan.

Mr. LUJAN. Thank you very much, Mr. Chairman.

I have one question. I assume there are ways to safeguard U.S. technology and the insurance question, the Chinese didn't agree to hold harmless the United States. My one question is that third issue, how do we guarantee a level playing field, how do we guarantee that we all play by the same rules? Is there some formula? Is there some way you can tell me? I think really that is the important part of this whole hearing, how can the United States guarantee that there is fair competition.

Mr. MCALLISTER. I agree, that is very important and it is going to be difficult. We are dealing with a non-market economy. I guess there are essentially two ways to go about that, placing controls on quantities or trying to place controls on prices. The Chinese have indicated they would be willing to hold their launches to four or less per year. Another way to look at it is to try to assess what their costs are and whether they are under pricing on cost. There might be a comparison with the cost model based on U.S. or Ariane experience. It might be some kind of forecasting method.

We don't have yet the terms of our negotiating position for this new agreement. We are very cognizant of the difficulty in dealing with a non-market economy and we want to be very careful in negotiating that agreement.

Mr. LUJAN. The point is if you don't know now how we are going to do it or you won't know before the 30 days are up, once the 30 days are up, we essentially lose jurisdiction over the matter if we ever want—I suppose not. I suppose the law will be passed or something like that preventing it but much more difficult.

That bothers me somewhat, that the 30 days are gone and we still haven't developed some way to ensure that level playing field.

Mr. McAllister. The President said he would not license these satellites until we have negotiated an agreement. I understand your concern that you may not have an opportunity to re-examine it in the next 30 days, 60 days or 90 days. These are three applications. We will have opportunities to look at future applications. I think if Congress is dissatisfied with the agreement we negotiate, undoubtedly the issue can be readdressed.

Mr. Lujan. The other side of that, and I guess the Chairman addressed that, is some other country—they are not our satellites, they are just being built by a U.S. company, they belong to someone else, and how can we tell them, "you can't launch your own satellite on your own rocket". It is a very complicated question. It is not an easy solution.

If we are free traders—I keep going back and forth with all these arguments, some pro and some con, certainly we all want to do all we can to encourage our fledgling launch industry but we want to have our cake and eat it too; we want to do business with them, but what is ours is ours and what is theirs belongs to all of us, I guess.

Mr. McAllister. Mr. Lujan, I think your point of view is shared by the Administration and in a sense, if we turn these down on a non-technology transfer related basis, we essentially are not in the game. If we accept these, we can engage with the PRC on some kind of agreement that will protect our domestic industry.

The Chairman. The Chair recognizes the distinguished gentleman from Florida.

Mr. Nelson. Thank you, Mr. Chairman. Good morning, gentlemen.

You say there is no technology transfer; is that correct?

Mr. McAllister. We think we can protect technology that is contained in those satellites. We do not see a national security threat in this application, this license.

Mr. Nelson. There is a considerable technology transfer when you take a very sophisticated American satellite and you show the owner of a launch vehicle how to integrate that satellite into that launch vehicle. That is called systems integration. That is one of the—is my time up, Mr. Chairman?

[Laughter.]

The Chairman. The gentleman can have his five minutes. That is what you call system integration.

Mr. Nelson. What sayeth thou?

Mr. McAllister. Let me ask Mr. Jackson.

Mr. Jackson. The interrupted question has been cut into two pieces. However, I believe that we will have safeguards. I think there are three things that we have to guard against. First of all, obviously, exploitation of the satellite itself. I think we can build safeguards against that. Secondly, the interface technology that you have just mentioned. And thirdly, I think we have to guard against the possibility of, "Suppose this thing explodes relatively close to the face of the earth and proceeds to scatter its contents?".

Obviously, we have to deal with all three of those possibilities and the name of the game in negotiating the technology safeguards will be to do exactly that. With regard to for instance exploiting the contents of the satellite itself, we will negotiate an agreement and I will admit, it hasn't yet been negotiated, but we will negotiate an agreement which attempts to keep the transfer of technology down to an absolute minimum, interface data only, for instance, on mechanical and electrical mating requirements, for actually attaching the satellite to the launch vehicle.

Mr. NELSON. Dr. Jackson, let me interrupt you because I only have five minutes here. Are you an expert in this field?

Mr. JACKSON. No; I'm not.

Mr. NELSON. I would suggest to you what you are saying is a bunch of words that although well intentioned, and I respect your position and it may be from your standpoint in the Department of State that the relationship between the United States and—

The CHAIRMAN. He is Defense.

Mr. NELSON. In Defense. It may be that the relationship between the United States and China is an overriding concern here. Anybody who understands something about systems integration just does not buy your argument.

If you are going to and it is going to be very difficult for us to overturn this export license so as we look to the future of the protection of the interests of the United States, don't just approach it with those kinds of words, approach it with some real protection.

I have in my hand the draft of the Administration's veto, Mr. Chairman, of our commercial ELV bill that just came out of the Senate Commerce Committee on Tuesday. You talk about hurting, putting a hurt on the United States of America, if on the one hand we kill this commercial ELV bill because of this threatened veto message and at the same time grant an export license for our satellites to go on foreign launchers, we will never have a prayer of fulfilling the President's articulated commercial space policy.

This Administration's threatened veto goes back again to the third party liability, they want to reform the entire tort system by putting a cap on pain and suffering damages. It goes into they don't like the fact of indemnification. They say that is subsidy. It is. It used to be that same rocket that launched was owned by the United States Government, not the individual company.

If there was the worse of all possible worlds, that a major disaster did occur, the owner of the rocket was the Government and under the old English common law, the King can do no wrong. The Government was protected. Not so if you want to get a commercial space launch industry off the launching pad.

The CHAIRMAN. Will the gentleman yield?

Mr. NELSON. I would be happy to yield.

The CHAIRMAN. The gentleman's time will be protected.

I think the gentleman is striking an extraordinarily important point to begin with here today. I'm glad he has brought it up. We will be discussing this relationship with the Senate on this legislation further. It seems to this member that what action we take in our insurance policy is going to determine whether or not we have a commercial launch program in this country at all. It is really that simple.

We view, this Committee does, I know the gentleman does and I do, too, and I know Mr. Walker does, that the insurance issue and how we do that is going to be critical to our ability to compete at all throughout the world. I just wanted to reiterate that point. I thank the gentleman.

Mr. NELSON. I thank the Chairman. He and I are absolutely suited up in the same harness, trying to achieve the same thing.

When Secretary Carlucci, your boss, called me about these concerns that I have raised about this export license, I took that opportunity to say, look, I'm a practical politician, I understand that in 30 days, in the waning days of the Congress, we are going to have very little chance to overturn this export license.

What is our best position for the protection of the United States? That is to give this industry an opportunity to get off the ground. What is the best way to do that?

We passed this legislation unanimously out of this Committee and out of the House. A series of negotiations have taken place over the course of the last several weeks and we finally got agreement and now to have this at the last minute sprung on us, saying we are going to kill that, you are going to definitely sound the death knell of this industry that has been articulated by this President, if some of you guys don't get to work and turn around this kind of stuff in the Administration. This goes back again, Mr. Chairman, to the question of the disarray of space policy making in this Administration that we need to be ever vigilant and try to straighten out.

I thank you.

The CHAIRMAN. I thank the gentleman from Florida. The Chair recognizes the distinguished gentleman from Pennsylvania, Mr. Walker.

Mr. WALKER. Thank you, Mr. Chairman.

If I understand correctly and you testified to it, this whole licensing process is premised on three agreements with the Chinese that relate to technology transfer and so on. Does the Administration have drafts of those agreements?

Mr. MCALLISTER. We have an idea of what we would like in technology transfer and what we would like in liability. We are not as far along yet in what we would like in the trade area.

Mr. WALKER. But you don't have drafts of them?

Mr. MCALLISTER. Not that I know of, sir.

Mr. WALKER. You don't have drafts. Do you even have your negotiating instructions settled at this point?

Mr. MCALLISTER. We won't have a—no, sir. Not until we finish the drafts.

Mr. WALKER. So you are in a situation where you are testifying to us that these three agreements are the basis on which we are making these licensing agreements, and you don't even have your drafts of what those agreements look like. You don't even have your negotiation position settled. Your testimony here so far has contained words like "we believe we will have safeguards," "we will attempt to keep the tech transfer to a minimum." Congress is being asked to buy a pig in a poke here.

You know, we don't have any idea at all what those things would look like. Wouldn't it make more sense for you to withdraw the license until those agreements have been concluded and we know exactly what it is that has been agreed to and then resubmit the full package to the new Congress in January? Wouldn't that make more sense?

Mr. **McAllister**. A couple of reasons why we probably wouldn't do well to go that direction. One is that these are rather timely applications. If we hesitate, we may end up losing, that is, Hughes or AsiaSat may end up losing these contracts.

Mr. **Walker**. We may.

Mr. **McAllister**. So timeliness is important.

Mr. **Walker**. That is like saying we will attempt to keep tech transfer to a minimum. We may lose them; we may not. There are all kinds of indefinite statements.

Mr. **McAllister**. If we used the word "attempt," that was a mistake. We will assure that we will not permit sensitive technology to escape our protection.

Mr. **Walker**. In all honesty, this sounds like Joe Isuzu.

Mr. **McAllister**. We will not permit these satellites to be shipped to the PRC until all these agreements are concluded.

Mr. **Walker**. The problem I have is that meantime Congress has been left out of the loop. So all of these things will be kept to a minimum. Congress won't know whether or not your minimum is our minimum or not. We won't know whether your safeguards are what we regard as safeguards or not. We will have no idea. We will simply be left to trust whoever it is that finally comes up with these agreements.

I get the impression that right now what we have is an agreement to probably agree, but we don't have anything more than that, and yet you are premising the whole licensing procedure on that agreement to probably agree, and Congress doesn't know anything about what is down in the details of those agreements. We usually don't buy those kinds of things here on Capitol Hill, and I am awfully shocked that this administration is asking us to buy it on something that is this serious.

Mr. **McAllister**. Mr. Walker, I understand your concern. I think part of it was the time constraints we were operating under. In a sense we are asking you to—

Mr. **Walker**. Buy a pig in a poke.

Mr. **McAllister**. Buy a pig in a poke, licensee's agreement, accept these transfers. But I would note that these are three applications. Undoubtedly we will be receiving more in the future. At that time, if Congress is dissatisfied with any of the three agreements, we can negotiate, or if we are not satisfied with them, these transfers will not go forward.

Mr. **Walker**. Let me suggest, though, that it would be a far better procedure to have the agreement to begin with. That if we are going to proceed along this line, that if, in fact, you have a licensing agreement that had been run through Congress and everything was settled, then as you address future issues you would be certain that there was widespread agreement; not to go through a process and then find out that it was badly flawed, that Congress can't stand it, have Congress reverse itself on those agreements, maybe reverse itself on future agreements, and create an even greater mess than what we now have.

I just don't understand the process. The process makes no sense to me whatsoever.

Mr. McAllister. This is the process written into the law. Also, if we delay this we may lose those satellite sales. In addition, I think to engage the Chinese in these discussions, to make these negotiations more successful, I think they would be more inclined to do so if we have announced our intent to approve these licenses subject to the agreements rather than an agreement and, if we are satisfied with the agreements, then we will talk about whether we intend to license these satellites.

Mr. Walker. As a result of the 30-day running, we are going to give the Chinese a veto over the matter but not Congress, and that just doesn't make any sense.

Thank you, Mr. Chairman.

The Chairman. The Chair recognizes the distinguished gentleman from Missouri, Mr. Volkmer.

Mr. Volkmer. Mr. McAllister, I would like to address the question where you keep saying maybe. Let me ask you as to whether or not Hughes could possibly lose its manufacturing of these satellites. Let's address the AsiaSat.

As I understand, the Chinese themselves have investment in the AsiaSat. Is that correct or incorrect?

Mr. McAllister. It will be a Chinese consortium, yes, owning the AsiaSat.

Mr. Volkmer. It is my understanding that if this license was not approved, then would Hughes be able to continue to manufacture it and put it up on the Ariane or an Atlas Centaur?

Mr. McAllister. No, sir. I think on this one we can say with some certainty that this sale would not go forward.

Mr. Volkmer. I don't want just "some certainty". Let's put it this way. If we were given a range of zero to ten and zero would be that it wouldn't go to Hughes, and ten would be that it would, where would you put it?

Mr. McAllister. I would put it at zero.

Mr. Volkmer. All right. So that is so many jobs lost, and it is still probably going to go on a Long March; is that correct? I mean Hughes will probably not manufacture it, but it is still going to go on the Long March.

Mr. McAllister. AsiaSat is a refurbished satellite that we have recovered through the shuttle. There will be no buyer for that if the Hong Kong Consortium doesn't buy it.

Mr. Volkmer. In other words, we lose it. We lose that sale.

Mr. McAllister. Yes, sir.

Mr. Volkmer. On the AUSSAT, as I understand it, their letter of intent directed Hughes to make best efforts to achieve all necessary approvals and enter into a launch services agreement for the provision of a Long March launch. I also understand that there was a competition between the Long March, the Ariane, the Titan, Atlas Centaur. Is that correct?

Mr. McAllister. I believe there was competition on the satellites with a British satellite manufacturer.

Mr. Volkmer. And there was competition also by those as to which vehicle would launch.

Mr. McAllister. My understanding is that AUSSAT was seeking a package, the best satellite manufacturer and the launcher. I think they expressed a keen interest in launching on Long March.

Mr. **Volkmer**. Yes, but I understand there was a competition.

Mr. **McAllister**. Yes, sir.

Mr. **Volkmer**. And that Long March won out on that competition.

Mr. **McAllister**. Long March and Hughes won out on that competition.

Mr. **Volkmer**. Maybe we can ask the Hughes people if it is not correct. Perhaps you do not know, but I understand that Ariane came in second in the cost on the launch vehicle, not any of ours.

Mr. **McAllister**. I don't know that, sir.

Mr. **Volkmer**. So it would appear to me that if Hughes would be continuing to manufacture, there would be a choice. If you refuse the license, it would be either to let Hughes go ahead and manufacture those two and put them up on the second costliest launcher, or to turn around and let the British firm manufacture and then put them up on the Long March. One of the two is going to happen.

Mr. **McAllister**. That is correct, sir.

Mr. **Volkmer**. If the Ariane was number two, we still don't have anything, do we?

Mr. **McAllister**. That is correct.

Mr. **Volkmer**. And there is a possibility, as you said, a good possibility that they could go to the British firm to manufacture the satellites, and the British firm could go to the Long March, and then we end up with nothing. They are still going up on the Long March?

Mr. **McAllister**. That is correct.

Mr. **Volkmer**. I think that some of us need to attend the briefing with Secretary Carlucci to determine the security questions. I am sure you are going to be able to work it out - - if not, the license won't be issued—as far as achieving, as much as possible, the level playing field and the liability questions.

As far as the level playing field, some of us have been trying to talk about a level playing field a long time for other products, but we don't think we have ever really gotten there. We still have the competition. This is just a little bit different, Mr. Chairman, because I think here there is no question that we have to look not only at the question that they are looking at, the security liability and level playing field, but really, would we have had these jobs? There are 750 jobs a year for three years that we could just lose all together.

Mr. **McAllister**. Yes, sir.

Mr. **Volkmer**. Thank you very much.

Mr. **Roe**. The Chair thanks the distinguished gentleman from Missouri and recognizes the distinguished gentleman from North Carolina, Mr. Valentine.

Mr. **Valentine**. Thank you, Mr. Chairman. I have just one or two short questions.

Mr. McAllister, is the technology that we are talking about here available to the Chinese from any other source?

Mr. **McAllister**. My understanding is that a good bit of the technology incorporated in that satellite is available to them now, although not packaged as a satellite.

Mr. VALENTINE. Do we have agreements with other nations and Europe, say Great Britain and West Germany, that would afford them access to the technology that we are talking about?

Mr. MCALLISTER. Yes. They are members of COCOM with us.

Mr. VALENTINE. So aren't we just talking about mainly trade? Once these satellites are sold, the technology is transferred and we don't really have any control over what the Chinese or any other purchasers do with it, do we?

Mr. MCALLISTER. We do have control over that.

Mr. VALENTINE. How can we possibly control whether they convert it to some military use? How could we possibly monitor their use of the knowledge and scientific advances that they gain from this technology?

Mr. MCALLISTER. Those restrictions will be negotiated as part of the technology transfer regime.

Mr. VALENTINE. But how do we enforce that?

Mr. MCALLISTER. Let me defer to Mr. Jackson.

Mr. JACKSON. You are talking about the Chinese now, or the Europeans?

Mr. VALENTINE. The Chinese.

Mr. JACKSON. Basically the way we would enforce it would be that if they violated the agreement, there simply would be no future licenses granted. After all, what we are considering here are the first three licenses. We have leverage over China. China wants to be in this business, albeit at a fairly small scale. If they violate our security concerns, we simply turn it off.

Mr. MINETA. Would the gentleman yield?

Mr. VALENTINE. Yes, I would yield.

Mr. MINETA. Do we have U.S. personnel there or do we just leave this to them?

Mr. JACKSON. We will have U.S. personnel there, yes. The agreement that we are going to seek to negotiate with regard to tech transfer will have both U.S. trained U.S. citizens who are employed by Hughes and who have been trained in U.S. security procedures and whose company obviously has a vital interest in not alienating the Department of Defense of the United States.

Secondly, there will be spot checks by U.S. Government officials, and there will be 24-hour per day surveillance of each and every movement in and out of the rooms where this equipment is kept.

Mr. VALENTINE. Let me say this, reclaiming my time, and perhaps finally. I don't necessarily oppose this sort of thing, but I think we spend perhaps a lot of unnecessary words when we talk about how we are going to protect ourselves when we transfer technology. I am not sure any of us have any secrets from anybody else anymore. If they don't get it from us directly, they can get it from our so-called friends and allies indirectly.

But what benefits really accrue to the United States by this deal except affording American business a way to make money, which is not bad, and a way to enhance our relationship with the People's Republic of China? What else is there?

Mr. MCALLISTER. I think those are the two benefits, but we do it at very little cost. We do it at no national security cost, and we have an opportunity to negotiate a level playing field in international launch services. So I think there are a lot of benefits and very little, if any, costs.

Mr. VALENTINE. To say that we do it at no national security cost, isn't that saying that there are no secrets which would have any military value to the Chinese involved?

Mr. MCALLISTER. No, sir. I am not sure whether there are secrets involved. I suspect a lot of this technology is available in other forms. But we believe we can protect that from the Chinese, so we are coming from a different premise, sir.

Mr. VALENTINE. Thank you, Mr. Chairman.

The CHAIRMAN. The Chair recognizes the distinguished gentleman from New York, Mr. Boehlert.

Mr. BOEHLERT. Unfortunately, we are going to have to leave in a few minutes for a vote on the Floor. We are witnessing the guerilla tactics of one of our colleagues, Mr. Walker.

When do we get out of the loop, Mr. McAllister? You say in your statement there are three conditions. One, the U.S. and the PRC will establish a government-to-government agreement to safeguard U.S. technology. That is extremely important and I applaud that. Then the U.S. will negotiate a government-to- government agreement that China will compensate the U.S. for any and all amounts for which the U.S. may be liable. That is important and I applaud that. Finally, we will have an agreement to prevent possible unfair Chinese pricing or trade practices relating to launch competition.

Now, supposing we say yes, go forward. Are we out of the loop from that point forward when you are dealing with these three conditions? Do we ever have a chance to review and say wait a minute, you are not protecting this sensitive technology, or our liability question is not satisfactorily answered? Are we still in the loop if we say yes?

Mr. MCALLISTER. You will be in the loop for all future licenses.

Mr. BOEHLERT. Future.

Mr. MCALLISTER. Yes, sir.

Mr. BOEHLERT. But these three?

Mr. MCALLISTER. These three presumably would go forward.

Mr. BOEHLERT. Now give me the other side of the coin. I take you at face value and I know the State Department and Defense Department want to protect sensitive U.S. technology, and I will buy that. I will accept it. I think you have the best of intentions.

What happens if we say no? What do we lose?

Mr. MCALLISTER. If we say no?

Mr. BOEHLERT. If we say no.

Mr. MCALLISTER. We will lose $300 million in exports, and I think we will lose an opportunity to negotiate a trade agreement with the PRC that will protect our domestic industry. If another country were to sell the satellites to the PRC to be launched on the Long March, the United States would not have the opportunity to insist that there be an agreement controlling Chinese launch service practices. So in a sense we have an opportunity and we have leverage with the Chinese.

Mr. BOEHLERT. I think in your statement, Mr. McAllister, you talked about setting the stage for a new field of international competition. My perception of what you were saying is if we say yes to this administration request, we will be key players in setting that stage for the new field of international competition. If we say no, we are going to be on the outside looking in. Is that accurate?

Mr. McALLISTER. I think that could very well happen, yes, sir.

Mr. BOEHLERT. I thank you, and I thank the chairman.

The CHAIRMAN. The Chair recognizes the distinguished gentleman from Maryland, Mr. McMillen.

Mr. McMILLEN. Mr. McAllister and Dr. Jackson, it seems like we are bending over backwards with regards to the Chinese on this issue, currying favor, if you will. I look at some of the things we are doing, ratifying these agreements in advance of being negotiated. We don't even know what the conditions are or how they will be arrived at.

There clearly are technology transfer risks no matter what assurances you can put in place. Clearly, we don't know about future pricing. There is serious risk to our own fledgling industry. There is serious risk that management techniques that we have acquired in this country over 25 years will be compromised.

My question is what tangible return are we getting? You mentioned some of the export sales and so forth, but the question I would like to ask for the record, and I am going to ask Secretary Carlucci this as well, given his recent visit to China, is: Is there any discussion that you have been involved in, either of you, any linkages between the Silkworm missile sales and these launch licenses?

Mr. JACKSON. If I could take that question, there was no direct linkage between missile questions and these licenses. However, I think that the Chinese, just like congressmen and people in the Defense Department, read the newspapers. China realizes that missile sales is a topic that we have special sensitivity over and that the overall relationship with the United States in the economic field, the military field, et cetera, was being negatively affected by such things as Silk Worm and other missile sales.

I think the discussions that Secretary Carlucci had in China were the most successful discussions we have had to date with the Chinese on this topic. While there was no direct linkage, there is an improvement from our point of view on these topics about which we have special sensitivity, and the Chinese in the context of these two days of discussions also raised the question of a satellite launch, but there was no direct linkage.

Mr. McMILLEN. Let me repeat my question. In meetings that you were involved in, was there any discussion of the Silkworm missile issue along with this vehicle launch licenses?

The CHAIRMAN. The Chair would caution the gentleman from Maryland to hold that question until another time.

Mr. McMILLEN. All right.

The CHAIRMAN. I think we better go vote while we are ready. Mr. Packard will be recognized on return.

We recess for five minutes or whatever to go vote. Please come back right away, though.

[Recess.]

The CHAIRMAN. The committee will come to order.

The Chair wishes to recognize the presence of Ambassador Dalrymple from Australia.

[Applause.]

The **Chairman**. Just before we were breaking, if the gentleman from California would hold for a moment, the gentleman from Maryland does have another minute and a half of his time.

Mr. **McMillen**. I just want to conclude by saying that this agreement seems to have been done in haste, and I just wonder why. There is a letter here on my desk from the European Space Agency, and it says, "Obviously, the presidential decision, taken with surprising haste," and then "contrasts sharply with the continuous hesitations of the U.S. over the last two years to enter into a formal agreement with Europe on the same subject." Obviously, we are treating China differently than we are treating Europe.

The question I was asking is does it have something to do with the administration's concern over the Near East, the Persian Gulf, the Middle East? It seems to me quite abominable that here we see sales of Silkworms and other armaments continuing by the Japanese to Iran, and yet here we are saying here is the prize, take it, China, now we will negotiate.

It seems like a backward negotiation to me. It seems that the administration has chosen the lesser evil, to fall over themselves to deal with the Chinese rather than to work out a detailed, long-term strategy not only for our ELV industry but for this whole situation across the world.

I raise that objection with an open mind, I might add to the chairman.

The **Chairman**. Will the gentleman yield?

Mr. **McMillen**. Yes.

The **Chairman**. In reading that letter further, there is a closing sentence on the second page in the first paragraph.

Would the gentleman identify the letter for the record, please?

Mr. **McMillen**. It is the European Space Agency letter to our trade rep.

The **Chairman**. To Bruce, you are talking about?

Mr. **McMillen**. Yes. September 19th.

The **Chairman**. And it comes from a George Van Reeth, who is the Director of Administration; right?

Mr. **McMillen**. Yes, sir.

The **Chairman**. For the record.

[The information referred to follows:]

SEP 21 '88 14:56 MARTIN MARIETTA COMERCIAL TITAN

esa

european space agency
agence spatiale européenne

JUR/16.2.17/9782/WD/9792

Paris, 19 September 1988

Dear Bruce,

The European Delegations participating in our consultations on commercial launcher services met on 13 September to consider the results of our last meeting in Washington and what further progress could be made in our discussions.

Obviously, the presidential decision - taken with surprising haste - to ask Congress and COCOM to approve the granting of export licences pending in the U.S. in order to allow satellite launches to take place on the Long March rocket in the People's Republic of China was debated and I reported on your and M Ralph R. Johnson's visit to me the previous day.

I was requested to report to you the great concern and surprise the U.S. approach in this matter has caused within the European Governments represented.

The speed with which the decision to enter into negotiations with the PRC on "a code of conduct" for commercial launch services with the PRC was taken, contrasts sharply with the continuous hesitations of the U.S. over the last two years to enter into formal negotiations with Europe on the same subject. The Europeans are equally disappointed, and frankly find it quite extraordinary that bilateral negotiations between the U.S. and PRC on issues which have been the subject of two years' talks between us, are publicly announced without any prior consultation within the framework of our ongoing discussions. We find it in contradiction with our common understanding reached at our last meeting on 26 July, that is that any such move by either side to any third party would be the subject of consultations.

./.

M Bruce WILSON
Assistant U.S. Trade Representative for Industry Services
Office of the U.S. Trade Representative
Executive Office of the President
WASHINGTON DC 20506

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SEP 21 '88 16:23 202 331 9895 PAGE.002

I was therefore asked by the Delegations to formally request from you early consultations on this subject prior to the start of negotiations with the PRC. We feel that the substantive points which we understand should be negotiated and agreed with the PRC before granting these licences are of concern to all of us and that consultations prior to the beginning of these negotiations are essential in order to define common views. We have always understood that such a common approach was one of the objectives in the consultations we have had over the last years. Thus, a multilateral negotiation between PRC, USA and Europe represents the only approach coherent with our previous discussions.

In any case, a "U.S./PRC agreement to protect the U.S. commercial launch industry from future unfair Chinese pricing or trade practices relating to launch competition" is insufficient in this regard, and any such agreement should rather attempt to define a reasonable approach by the PRC to the commercial launch services market as a whole.

Moreover, we understand, and expect your confirmation, that the first three US satellite launches (AUSSAT and ASIASAT) are part of the overall negotiation on trade practice especially concerning the pricing policy.

I would be grateful if you could inform the other Departments of the U.S. Government involved in the decision-making on this issue.

It is a very important and sensitive matter affecting the future vitality of commercial ELV industry in Europe, and I understand, in the U.S. too.

So it requires a careful analysis of any agreement with PRC and eliminates the possibility of precipitated talks.

Yours sincerely,

George van Reeth
Director of Administration

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Mr. McMillen. The interesting point that puzzles me in this letter too, and I quote at the end of that paragraph, and not meaning to take it out of context: "Thus, a multilateral negotiation between the People's Republic of China, the United States and Europe represents the only approach coherent with our previous discussions."

I just wonder how many times the French are going to negotiate with us on their customers. I just wonder about that.

The Chairman. I thank the gentleman.

The Chair recognizes the distinguished gentleman from California.

Mr. Packard. Thank you, Mr. Chairman.

I would like to pursue this discussion with ESA just a little bit further. How much business are we now doing with ESA?

Mr. McAllister. I am not sure how much we are doing. Let me see if I can answer both your questions, what I think are your questions. We treat China not as well as we treat ESA. Right now, if Hughes were to sell a satellite to a customer, to a European customer to launch it on Ariane, there would be no technology review. They would not be subject to what we are doing to China right now.

The notion of a trade agreement, we have been discussing that, pursuing consultations with the Europeans for a couple of years now since the President's 1986 decision, and now that they want to discuss trade, now that they apparently are serious about some kind of trade agreement is very encouraging.

But I think the notion is that we haven't given the Chinese anything and we haven't given them anything but we have put more leverage in our pocket because now we have our intent to license these applications subject to the conditions that are very important for the U.S. national security and U.S. economic standpoint. That is the leverage we have.

Mr. Packard. The question again, though, is how much business are we and are high tech companies, U.S. companies doing with ESA?

Mr. McAllister. I don't know. I can find that out for you, sir.

Mr. Packard. A substantial amount?

The Chairman. Oh, yes.

Mr. McAllister. I would imagine so. These satellites are very expensive.

Mr. Packard. Does ESA have a subsidized launch program?

Mr. McAllister. That is what we have been discussing with ESA for two years now.

Mr. Packard. Is that comparable to what the Long March is being proposed for?

Mr. McAllister. There are two different systems. With ESA it would be easier to identify subsidies because it is a market-based economy. With the PRC, they are a non-market based economy, so it is more difficult to identify subsidies.

Mr. Packard. Do we have the same export requirements with ESA as now being imposed with China?

Mr. McAllister. No, sir.

Mr. Packard. Entirely different. I read the letter from ESA, and there is no wonder that they are concerned because obviously this would be eating into some of their business, and another competitive entity is entering into the picture. That is not only true for the United States launch facilities but ESA's, of course.

In your judgment, how much high tech business would U.S. companies, or how much business would high tech U.S. companies lose if we prevented them from competing on foreign launch facilities?

Mr. McAllister. I can't give you an estimate, but let me explain how that would happen. If the U.S. refused to export or license Hughes satellites, presumably then a satellite customer would seek a satellite from a country that would license and export. There are COCOM countries that license them. There are also other countries that build satellites that are not COCOM-controlled.

The Chairman. Would the gentleman yield?

Mr. Packard. Certainly.

The Chairman. I think it is important to get into the record that this contract is rather unique in the sense, as I understand it, that in effect, the Australian country will take title when the satellite is in orbit and producing. Is that correct? That is correct. I know that is correct. That is correct.

The point is that it is a package system in this instance, which is really quite unique.

Mr. Packard. That is another follow-up question. Is the packaging, including the launch, generally the way that U.S. companies build and compete on satellites, or do they negotiate, does the contracting company generally take care of their own launch?

Mr. McAllister. I am not sure we have enough experience in that because of the nascent nature of our commercial launch industry.

Mr. Volkmer. Would the gentleman yield?

Mr. Packard. I will be more than pleased to yield.

Mr. Volkmer. I would suggest that we wait until the representative from Hughes testifies. He would know more on that.

Mr. Packard. Thank you.

Is it true that McDonnell Douglas is building or has built the launch facilities in China?

Mr. McAllister. Not that I know of, sir.

Mr. Packard. You are not aware of it. No American company has been involved in building the launch facilities? I was misinformed on that.

The Chairman. Would the gentleman yield one more time? You are striking at a very important point. What this particular issue is about is precedence setting, from our understanding. The people are buying, in effect, a system. They are taking title to the satellite when it is producing. That includes the insurance and the launching and everything else.

The point that Mr. McAllister made in the further negotiations to take place, where the Chinese, as I understand it, have agreed for total indemnification, so to speak, as far as the insurance is concerned, is an extremely important issue as far as this country is concerned.

One of the reasons, of course, as you are well aware, and I know you worked hard on that bill in establishing a competitive insurance liability issue, is that without that competitive insurance liability, if the wave of the future is for people to be launching systems approach to this whole thing, we in America will be in a terrible position unless we have fortified and underpinned our private enterprise, so as to speak, in launching with adequate insurance to be able to compete.

Why would I send a $400 million satellite into space on one particular area where I only get 60 percent coverage when I can put it on the other and get 100 percent coverage? That is all part of the competitive bidding aspect.

I thank the gentleman for yielding.

Mr. PACKARD. I will just conclude by stating that it appears to me that we are entering into an age of the international marketplace in launch facilities. Our trip to South America made that clear. Our meetings with ESA in Europe have made that clear. We see that not only is China coming into the marketplace, but we can assume that other countries are going to do the same within the foreseeable future.

We are going to have to wade through these troubled waters at some point in time, and I believe that this experience that we are now going through with this export requirement or application is going to force us to make some, I think, long-term policy decisions that don't just affect the PRC and Hughes—in this instance it does—but is going to establish the process by which we are going to operate internationally and globally in this whole area.

I believe it has got to be done. I personally welcome this requirement that we address the issue and address it quickly. We have been looking for ways to have leverage with ESA, frankly, and we haven't had good leverage with them because they have been the only marketplace available since the Shuttle has been shut down. We have struggled with our own ELV launch facilities in the last two years, and thus we have had no leverage.

All of a sudden we find ourselves where ESA is beginning to recognize that we have leverage. I think it is going to produce some remarkable possibilities in negotiating not just with the PRC but with ESA and Japan and other launch facilities as they come into the marketplace. If we don't take a leadership role in this area, someone else is going to do it, and it won't be the United States. That would be a tragic mistake.

The CHAIRMAN. I thank the distinguished gentleman from California and I recognize the distinguished gentleman from Pennsylvania, Mr. Kanjorski.

Mr. KANJORSKI. Thank you, Mr. Chairman. Mr. McAllister, as I understand it, the motivating force behind this is to capture the $300 million sale, and that all things being equal for American competitors, that we should rule and accept this type of procedure; is that correct?

Mr. MCALLISTER. The motivating force, I think, is that we have a commercial interest who wants to sell a product abroad, and we don't have a sufficient national security reason to say not to.

Mr. KANJORSKI. I want to ask you about that. In other words, I've heard you say, we're not giving the Chinese anything. We're not going to let them in on any of our secrets; there's no technology transfer we have to worry about. Is that all correct?

Mr. MCALLISTER. Yes, sir.

Mr. **Kanjorski**. I assume that that's not one of our concerns. The Defense Department agrees to that, too?

Mr. **Jackson**. Yes, I would agree, sir.

Mr. **Kanjorski**. Okay, well, if that's the case, everything else being equal, if we substitute the Peoples Republic of China for the Soviet Union and the same proposals there, would you be before this Committee recommending that these satellites be put in space by the Soviet Union systems?

Mr. **Jackson**. No, sir.

Mr. **Kanjorski**. Why?

Mr. **Jackson**. Our policy with regards to technology transfer to the Soviet Union is vastly different than our policy with the People's Republic of China.

Mr. **Kanjorski**. Then there is something in technology here that would benefit an adversary such as the Soviet Union, that would not benefit a friendly adversary—whatever that relationship may be now with the People's Republic of China; is that correct?

Mr. **Jackson**. I think there are two points to that. The Soviets are more capable of taking advantage of this technology; and, two, we could not protect it within the Soviet Union as we can with the technology transfer to Beijing.

Mr. **Kanjorski**. I think my friend there said we need a strategy, an overall strategy, and I seem to be looking at this as a piecemeal approach. It seems to remind me of something this country and this government did back in 1979, if you will remember, with the gasoline from the Soviet Union to Western Europe.

I seem to remember a company in Illinois in the minority leader's district that almost went broke because we felt that to sell Caterpillars the Soviet Union in 1979, would be an astronomical transfer of technology, which I still don't understand. But they built that pipeline, and now all of a sudden in 1988, when I was recently in Europe, I find out the biggest customer of the Soviet Union pipeline is now the United States Army or the Defense Department. That's how we heat our military bases over there. They justify it on the lowest price consideration.

In talking with your Defense Department, I ask you, if that's the case, why don't we buy our petroleum for our tanks and for our airplanes—and I opened up my questions today with, why aren't you here, if it's a bottom line in doing good business and keeping the cost down and there's no transfer; why aren't we negotiating with the Chinese to rent 3 million of their servicemen and some of their tanks to defend our positions around the world?

Save all these billions that we're spending in your Defense Department so that we can't meet the technological needs of the space efforts that we want to put forth in this country and keep up with the technology. What's your answer to that?

Mr. **Jackson**. I think the answer is, we feel the Army of the United States is far better that the army of the People's Republic of China, and we're quite satisfied with what we are getting from our dollar.

Mr. **Kanjorski**. But will you buy all of your material from China or from the Soviet Union if it's cheaper? Will you buy the fuel and the food?

Mr. JACKSON. No, I think there are some things that we would consider procuring abroad, but in most instances—

Mr. KANJORSKI. Not abroad—from the adversary. It's different to buy it from Europe than to buy it from the Soviet Union.

Mr. JACKSON. We consider China to be a friendly, non-aligned country. We do not consider China to be an adversary like the Soviet Union. I think that that's an important distinction that we have to keep in mind.

Mr. KANJORSKI. Okay, you're setting up policy here. As I understand you, when you write these agreements, these are going to be models for future agreements. Why can't we expect before this Congress in six months or a year, a request from another manufacturer substituting the China rocket with the Soviet rocket?

If I remember, just three or four months ago on national, American television, executives from this company were talking about using Soviet launch capacity. It just seems to me that suddenly they've turned around and realized that this wouldn't necessarily be the best proposal to make two months prior to an election, so we now have the Chinese missile system in place; is that correct?

Mr. ROY. Mr. Kanjorski, perhaps I can address your question. The reason is that our policy vis a vis China and the Soviet Union on the question of satellite launches is fundamentally different. Certain aspects of the issue that's now facing us are not new. For example, the decisions on our part of the willingness to consider Chinese launch vehicles for satellite launch vehicles on a case-by-case basis was made at least two years ago at the time of Secretary Weinberger's visit to China.

It was made in the context of our overall friendly relationship with China and the nature of the technology cooperation that we engage in with China in many civilian areas and certain military areas—cooperation that is fundamentally different from the sort of cooperation that we are prepared to engage in with the Soviet Union in those areas.

In the case of the Soviet Union, our presumption is disapproval of any such requests. In the case of China, the decision was a presumption of approval, after review on a case- by-case basis. What happened in July was that we were confronted with specific applications on an issue which we had already addressed earlier with the principles involved.

The CHAIRMAN. If the gentleman would yield. We also have a prohibitionary situation existing where we can't use the proton rocket. It's that simple. We don't have that situation existing as far as China is concerned.

Mr. ROY. None of the agreements that we would negotiate with the Chinese are models for similar agreements with the Soviet Union and they are not intended to be.

The CHAIRMAN. But if the gentleman would yield, that does not preclude Europeans or anybody else to use the Proton rocket if they so choose; am I correct or wrong on that—unless we put the pressure on them?

Mr. JACKSON. Except those licenses would have to go through COCOM.

The CHAIRMAN. I understand that.

Mr. JACKSON. There we have—

The **Chairman**. I'm also coming back to saying that we could very readily ultimately have—the gentleman's time has expired, but let me interject this thought. If we are looking now to a change of pace taking place in the method of delivering satellites into space as a systems approach, the others can be quoting against this using the Proton rocket. Agreed, we have to go through the COCOM situation, but isn't it also that we're going through COCOM here, too? Isn't that correct? It's my understanding.

Mr. **Jackson**. If we were to face a situation with a Soviet rocket being suggested as a launcher, I assume this government would plain and simply veto that license application in COCOM.

The **Chairman**. That's what I'm saying. All right, the Chair recognizes the distinguished gentleman from Illinois, Mr. Fawell.

Mr. **Fawell**. Thank you, Mr. Chairman. I have two questions. As I understand all that is gong on here, we have fears about a level playing field and fears in regard to technology transfer. In regard to the latter, referring to Mr. Walker's concerns, and I think Mr. Nelson's also; it appears as though you will be going ahead with this, of course.

Do you plan for any kind of Congressional advisory group that is working with you? That may be deemed to be unconscionable or unconstitutional; I'm not sure which. Perhaps that would allay the fears that Mr. Walker, for instance, outlined.

Mr. **McAllister**. I think we'd be happy to brief the Congress on our objectives on these three agreements and on the progress in negotiations.

Mr. **Jackson**. I would assume we would be able to keep Congress informed at all times as we move through this process, through that briefing process.

The **Chairman**. If the gentleman would yield—well, the Committee intends to see that that's followed through the oversight process. The gentleman is recognized.

Mr. **Fawell**. Now, the other question I have is in regard to the level playing field. We all understandably look to the other party and see all kinds of advantages which they have over us. I would ask the question, does the United States really in any way subsidize the U.S. commercial launch industry? That's the first part of the question.

Secondly, in regard to the U.S. commercial launch industry competitiveness, are we competitive? The reason I ask that question is, I have read several comments and some criticize American commercial rockets being basically much more—the technical standards are beyond what is needed in commercial cargo hauling. Are we as competitive as we ought to be?

Mr. **McAllister**. May I answer your question sequentially? We do not provide—the government does not provide any subsidies to the commercial launch industry.

Mr. **Fawell**. They are obviously very much related to the defense industry and through all that, there's not anything that would be deemed subsidies being given to them?

Mr. **McAllister**. I suppose you could find comments that would tell you there's a subsidy, but I think that most people would agree that there's not.

Mr. **Fawell**. All right, what about the other part of the question?

Mr. **McAllister**. Are we competitive? I think we are clearly competitive.

Mr. **Fawell**. But are you overqualified? Are you putting too much on this and thus not able to compete, perhaps, with the Chinese?

Mr. **McAllister**. As a government employee, I'm not qualified to say whether our business—we're loading too much on these satellites. However, if we are, I think international competition will bring about any necessary adjustments.

Mr. **Fawell**. Well, as I understand it right now, understandably, the U.S. commercial launching industry is complaining about their not being competitive because they're running up against the introductory offers of the Chinese. On the other hand, some of the articles I have read have said, well, you've got a product here which is perhaps not overqualified.

It's got a lot of gimmicks, et cetera, to it that you really wouldn't need. Some say that when a company deals with the Department of Defense, over the years, you become a little less cost conscious, sloppy, because there's more than enough money to go around. I'm not saying that quite as well as I should, I suppose. I don't mean that in a detrimental manner.

The **Chairman**. You have made your point.

Mr. **Fawell**. Maybe you would not want to answer the question, but we've got a high quality launching mechanism here, but maybe it's just much more than is needed to be out there competing.

Mr. **McAllister**. Well, I think the customers will decide that.

Mr. **Fawell**. All right, thank you. That's all the questions I have.

The **Chairman**. The Chair recognizes the distinguished gentleman from Florida, Mr. Lewis.

Mr. **Lewis**. Thank you, Mr. Chairman. I'm greatly excited about this program, but also very cautious about it. I'd like to ask you a couple of questions, Mr. McAllister, with respect to what consideration has been given to our U.S. satellite launching industries in respect to this.

Mr. **McAllister**. Well, we have tried to ensure that we do not harm our satellite industry. This is one of the reasons we are very conscious about not halting these applications, because they are U.S. satellites to be launched. They are U.S. satellites to be sold—$300 million in exports.

We want to promote our satellite industry, and we're concerned that if we were to try and restrict these licenses on non-national security grounds, it may end up hurting our domestic satellite industry, because satellite customers will then go to other countries and other manufacturers to purchase satellites.

Mr. **Lewis**. How long has this been going on that we come to this Committee and Congress at this point in time, with an expedited issue such as this?

Mr. **McAllister**. We received the applications, the completed applications in mid-July. We have spent a month and a half reviewing them on the technology transfer grounds, and we've felt that we are satisfied in going ahead to notify Congress of our intent to license these.

We have not yet identified yet particulars of our objects in the trade negotiation because we've had a month and a half. Before we will license these satellites, we will have the kind of agreements that are necessary to protect the U.S. national security and U.S. economic security.

Mr. LEWIS. I guess some of my concerns are that this is probably one of the fastest moving programs that—scheduled to be one of the fastest moving programs that we've had in the space area. It normally takes us anywhere from 18 months to 2 years to get some sort of agreement, just in principle, on something.

You're talking about a few months in order to make an agreement with someone who is supposed to be a friend, and my concern about this is that we are looking here in the United States at a commercial program, and we're turning around and moving to foreign lands to put our satellites into orbit.

I just don't think in my mind, that COCOM disagrees with using Soviet launching, but it appears that COCOM, within a very short period of time, is ready to make a decision to go along with the Chinese launch program.

Mr. MCALLISTER. I think the COCOM rules call for a four-week review. I think the first two weeks, if one of the COCOM partners has a question, the clock stops until that question is answered. The second two weeks, the clock keeps running. So, COCOM—hopefully we will be able to get it through COCOM fairly quickly.

Your point about moving hastily—I think with regards to the PRC, we are not moving hastily. This gives us enormous leverage in trying to get the kind of agreement we want. They know that they have to sit down and deal with us, or else they will not get these satellites. The onus is on the PRC to negotiate the kind of agreements we want.

Mr. LEWIS. Again, initially and earlier today, the systems integration question was raised, and I have concern about that as well. I'd like to revisit that just for a moment and have you again explain to the Committee, how you're going to secure integration of systems and not have a technology transfer that could backfire upon us?

Mr. JACKSON. I think the major thing to remember here is that this satellite will be brought into China in a very secure manner. It will never leave the hands of the people who own it, and they will watch it on a 24 hour basis and we will watch the fact that they are watching it. Furthermore, the system integration question, as I understand it, basically the amount of tech transfer involved in the interface is relatively minimal. I'm not going to sit here and contend that there's absolutely no information transferred to the Chinese as a result of this. No.

But the amount is relatively small, having to do with hooking up the connections between the satellite itself and the booster. I don't think that this is going to be anything that's going to astonish the Chinese scientists who, after all, have put satellites in space before and do have rockets. I think we are asking you to balance here an amount of tech transfer that we think is going to be minimal and that we are going to tightly control with a very stringent agreement and the benefits that are going to accrue to the U.S. satellite industry, as well as to the overall U.S.-China relationship.

The **Chairman**. If the gentleman will yield, there's a point we can't lose sight of. They're not our satellites, per se. They belong to the Australian Government. That's an important distinction to make. That's a very—

Mr. **Jackson**. They are manufactured by us.

The **Chairman**. I want to let that drift. The assumption here is that this is something that we're going to be doing someplace else. And the question remains that the Australian Government is buying or their subsidiary is buying the satellites from the United States. That is the difference between the issue. If we don't want to sell them the satellite, they'll buy somebody else's satellite. The Chair recognizes the distinguished gentleman from California, Mr. Mineta.

Mr. **Mineta**. Thank you very much, Mr. Chairman. I don't want to take all my time because frankly I think we ought to get on to some of these other panels we have before us. It's going to be a long day. But what I'd like to ask, first, is there a long term commitment by the Chinese to limit in any way their heavy launches to any number per year, like maybe let's say four heavy launches a year?

Mr. **McAllister**. The Chinese have indicated that they'd be willing to limit their launches to four per year.

Mr. **Mineta**. Everything you've said, from what I've heard so far, is in terms of the advantages of why we ought to go ahead with this because we'll lose $260 to $300 million in trade, etcetera, but I'm wondering even though we're dealing with this on a one-on-one situation, is there some overall rubric of policy that we're making this decision or do we make each of these on a one-on-one basis as far as the decision on this one. You know, DOD drags their feet on export licensing to the disadvantage of our companies in this United States. And yet here we're being jammed in a very short period of time to approve this application. But I'm wondering as far as any of these applications are concerned, is there some overall policy parameters that you have to make these decisions?

Mr. **McAllister**. Yes, sir. We do have definite policy parameters. With regard to the sensitivity of technology, how it might be used, the general framework of COCOM in our technology transfer laws we will look at all these satellite—any future satellite proposals again on a case-by- case basis to see how they match our larger parameters.

Mr. **Mineta**. But see, the thing that bothers me is that the Japanese and the Soviets are eager to get into the business of satellite communications as well, and Asia, and all you're discussing are the points on this specific one. It seems to me we also ought to be getting into this whole issue of what are the long term advantages of expanding our western capabilities in Asia. And it seems to me we're going to be losing that ability through this application that's now before you. And yet I have heard nothing about western satellite technology in Asia, and we sort of seem to be saying, yeah, if we don't approve this, we'll lose $260 million. Yet, on the other hand, the Chinese get hard currency for which they are then going to be able to use that hard currency to expand their own capabilities in the future against us, and that doesn't seem to make any sense.

Mr. McAllister. I think that it's the opposite. That by approving these applications, we have the opportunity to set some kind of long term framework. By engaging the Chinese, Mr. McMillen was quoted in the letter from ESA, we have an opportunity to open, to get involved in international competition in launches to set the terms to be engaged in that.

If we turn down these applications, we could very well lose that opportunity because there may very well, the Australians or AsiaSat may very well go to a different—

Mr. Mineta. Let's use that as an example. Here they get hard currency from us and then they go to AsiaSat and contract with them.

Mr. McAllister. Well, there's a—if they get hard currency, it's from Australia and the customer whom they are launching for. But it's not clear that they will necessarily use that hard currency to subsidize or to further engage in the commercial launch. They'll use that hard currency perhaps to purchase other U.S. technology. We are the PRC's largest technology exporters.

Mr. Mineta. I have a lot of questions here that we can deal with I guess with Secretary Carlucci, but I come from Silicon Valley, and frankly, the export licensing issue is so screwed up and DOD has dragged their feet on other things where we have obsolete technology that can't even be exported and here we are in the state-of-the-art technology and we're anxious to get this thing through. For what? For $260 million today? But in the long term, what are the implications of what we're doing here, and I haven't heard that.

The Chairman. The Chair recognizes the distinguished gentleman from New York, Mr. Hochbrueckner.

Mr. Hochbrueckner. Thank you, Mr. Chairman. I think we can all appreciate the advantages that come with this program in terms of improving the relationship with China. The $300 million certainly, it won't reverse our trade imbalance of $170 billion annually right now, but it will help.

But coming from an engineering background myself in aerospace, I'm concerned about the security and the inadvertant transfer of technology. And so far, what I've heard hasn't convinced me that you've covered all the bases. Now obviously, we have to provide the electrical, mechanical, thermal interfaces. We have to provide the telemetry, the command codes. There's obviously a lot of information that we do need to provide in order to assure an appropriate interface between the rocket and the satellite and do the job right.

Now obviously some of that knowledge is common. It's in the literature, we've all read about it. But obviously some of it is not. And of course, I understand that U.S. citizens will have direct control of the satellite. My concern is more down into the detailed level. The same kind of problems we've had with the Aegis sale in terms of Japanese having the opportunity to reverse-engineer and, in fact, have an inadvertant transfer of technology.

My concern is who controls the schematics, who has the schematics, who has the assembly prints? Have we set up in the agreement a facility where we have exclusive control, where they cannot come in and photograph this important information that isn't common knowledge? What's being done there? Is this written into the agreement? Has the agreement been signed? What does it look like? Can we review it? Can we see, in fact, that it does cover these things?

If we have computers at this facility, where we have the schematics, does it meet 5100? What are we doing to assure that the technology associated with these satellites is, in fact, secure and that this relationship with the Chinese can go on?

Mr. JACKSON. These are precisely the things that will need to be in the agreement with the Chinese and—

Mr. HOCHBRUECKNER. So we don't have the agreement yet?

Mr. JACKSON. We don't have the agreement yet, no. The agreements have not yet been negotiated with the Chinese. Basically, the President has said that he approves these licenses on a conditional basis, on the condition that, for instance, tech transfer concerns of the United States Government are fully and completely met. And those are exactly the concerns—

Mr. HOCHBRUECKNER. Then what can we do to get in the loop so that these agreements that you do sign, this Committee has a little bit of something to do with the words in the agreement?

Mr. JACKSON. As we said earlier, we will be more than happy to come up and brief you as soon as these negotiations move forward and get your suggestions for—

Mr. HOCHBRUECKNER. Okay. Well what we would hate to find is a situation where you come up with an agreement, there's a handshake on it, and at that point we get to review it. Certainly from my own perspective, having worked in the Tempest field and other areas, I would certainly like to have some input as to the kind of agreements that you do write to assure that we do not, in fact, inadvertantly give away this technology.

Mr. JACKSON. We understand your concerns and we will come up and brief you whenever it's desirable and convenient to you.

Mr. HOCHBRUECKNER. I'm sure if you could arrange that through the Chairman, I'm sure Mr. Roe would be glad to arbitrate that. Thank you, Mr. Chairman.

Mr. JACKSON. Frankly, we welcome the input of expertise.

The CHAIRMAN. The Chair recognizes the distinguished gentleman from Colorado, Mr. Skaggs.

Mr. SKAGGS. Thank you very much, Mr. Chairman. I apologize for not having been here at the beginning and would like to submit an opening statement for the record.

The CHAIRMAN. No objection, so ordered. Also I believe Mr. Mineta has a formal statement he wishes to place at the introductory to the witness testimony today. No objections, so ordered. Proceed.

Mr. SKAGGS. Just to follow up a little bit on my colleague from New York's line of questioning, we're not going to have reached any conclusion about the content of these agreements, assuming that we do reach a conclusion, until on into the next Administration. Is that not likely?

Mr. MCALLISTER. We will endeavor to conclude these agreements as quickly as we can, but we will not conclude a bad agreement. I can't make any predictions about when we'll be completed.

Mr. **Skaggs**. Well, you won't even be through with the COCOM process at the earliest until the middle of November, and that may not go that quickly. Isn't that true?

Mr. **McAllister**. That's a fairly safe estimate, yes.

Mr. **Skaggs**. And then you get down to talking turkey with the Chinese and how long do you think that's going to take?

Mr. **McAllister**. We can do that simultaneously. We do not intend to—we will submit, for COCOM review, after the 30 days are concluded, congressional review is concluded, but at the same time, I think we're going to try and engage the Chinese as quickly as we can.

Mr. **Skaggs**. Well you mentioned earlier that, assuming that the license approval process goes through, the onus will be on the Chinese under those circumstances to negotiate an agreement that we want. Why isn't the onus on the Chinese to negotiate an agreement that we want even if we haven't acted yet on the license application?

Mr. **McAllister**. I suspect it's a matter of—part of it's a matter of faith. They will not—I guess when you put the prize out on the table, they're more eager to negotiate to see that prize. I suspect that if we were to tell the Chinese, first you negotiate these agreements, and then we'll talk about whether you get the satellites, whether you get to launch the satellites, it may reduce their ardor.

Mr. **Roy**. My understanding is we do not issue the licenses until we have the agreements. That was the President's decision. What he announced was his intent to issue the licenses assuming that we get the three conditions that he set in his decision on the issue.

Mr. **Skaggs**. And it's very likely it will be the next President that is trying to operate under the conditions that this Administration has set.

Mr. **Roy**. We can't estimate the amount of time that will be required, but our intent is to move the issue as fast as we can get a position to lay before the Chinese.

Mr. **Skaggs**. Well, that particularly is troubling then in light of your earlier statements that you want to act in good faith to brief and coordinate this process with the Congress since the Congress isn't going to be in the position to be a partner with you in those sorts of discussions during most of November and December. And I'm wondering how we're going to reconcile that.

Mr. **Jackson**. I think we'd have to leave that to the Chairman of your Committee to reconcile that problem. If we move forward with sufficient rapidity as to require consultation, you know, at some—

The **Chairman**. To add a point to the discussion, fortunately this Chairman does not have anybody running against him this year. So I hope, the Lord willing, I'll be here.

Mr. **Skaggs**. Well all of that is to suggest a set of circumstances in which we really have the cart before the horse in both the process that is mutually respectful of the roles of the legislature and the executive, and also having sufficient information for us at this time about the content, at least in outline form, of an agreement, so that we can give you the marching orders that you're asking for. And I find it—it may be strange to use the pig in the poke argument, but we're really buying this on faith at this point, and that's very troubling. Thank you, Mr. Chairman.

The **Chairman**. The time has expired. There's no further questions for this panel. We want to thank you very much for being with us and it's taken a little bit of time to get the foundation laid, but I think you've done it very, very well and we appreciate your testimony very much.

The Committee is going to continue right on through, because we have a two—a lot of people have come a long way to testify today. Our next panel is going to be made up of some economic people involved in this issue. Mr. Roger Sullivan, President of the United States-China Business Council, and I believe we have with us Ambassador Arthur Hummel, our Former United States Ambassador of the People's Republic of China. And also on the panel is Peter Suttmeier of Hamilton College.

The Chair wishes to welcome our distinguished group, our panelists here, and may I suggest, because of the import of being able to have adequate time for the members to present their questions, that perhaps what we should do is to include your—unanimous consent that your statements will be included in full in the record, and I think you would give more time if you could summarize the key points that you would like to make, and then we can go to our questions.

So, therefore, on that basis, the Chair recognizes Mr. Sullivan.

STATEMENT OF ROGER SULLIVAN, PRESIDENT, U.S.-CHINA BUSINESS COUNCIL, WASHINGTON, D.C.; AMBASSADOR ARTHUR HUMMEL, FORMER U.S. AMBASSADOR TO THE PEOPLE'S REPUBLIC OF CHINA, CHEVY CHASE, MARYLAND; AND PETER SUTTMEIER, HAMILTON COLLEGE, CLINTON, NEW YORK.

Mr. **Sullivan**. Thank you very much, Mr. Chairman, and I will summarize my statement as briefly as I can.

I am Roger Sullivan, President of the United States- China Business Council, which I would like to emphasize is a private organization of American companies that are engaged in business with the People's Republic of China.

The **Chairman**. Would the gentleman suspend for a moment. The Chair has been a little out of order here. There are a series of questions that we want to propound to the previous panel, and if there is no objection, we will submit those requests to the panel to respond to us in writing. No objection; so ordered. I apologize to the gentleman. Proceed.

Mr. **Sullivan**. We are funded almost entirely by membership dues and research and publication income, and have no organizational or financial links with the People's Republic of China. I think it may be of some interest to the panel that we represent the interests of a number of companies who have interests in this issue, including Hughes Aircraft Company, which is one of our members; Martin-Marietta; McDonnell Douglas; and Ford Aerospace.

I wanted to emphasize, and I think this is why you asked me up here, the importance of the U.S.-China economic relationship to the United States economy. Trade has grown dramatically, to over $10 billion in 1987, making us China's third largest trading partner. In terms of investment, the State Department is a little behind the times. We are now the leading investor in China, not the third largest investor in China, with over now almost 400 American companies investing close to $4 billion.

Our trade with China has tended to be a balanced trade, and I think that is the trend of the future. From 1982 to 1985, we ran large surpluses with China. From 1982 to 1985, the trade was in approximate balance, and it has only really been in the last two or three years that we have run a deficit with China, and that's because of the drop of our agricultural exports from about $2 billion a year in 1982 to almost zero in 1986.

In the first half of this year, American exports to China have surged 46 percent, while China's exports to the United States have increased about 20 percent, and we are starting on the process of narrowing and eliminating that gap. We are confident that the expansion of American trade and investment in China will accelerate over the next several years, I think for a number of objective factors:

China is and will remain for some time the largest growing economy in the world, and that's not just our judgment, it's the consensus of international financial institution economists and the private sector as well.

I would call the committee's attention to a September 19 press release from Moody's Investors Service, which is releasing a report this week. They comment that the liberalization of China's economy, initiated by Deng Xiaoping 10 years ago is now deeply rooted and strong enough to survive even in Mr. Deng's absence.

And after considering all of the positive and negative factors affecting China's economy, Moody's concludes that "China will easily accede its growth target rate of 7.5 percent a year for the 1986-1990 period, and will be on a firm course to surpass its goal of quadrupling national income during the period 1980 to 2000."

China has also recovered very quickly from a foreign exchange reserves problem it had in 1985 and 1986. Foreign exchange reserves are again increasing modestly, putting China in the position where it can begin, once again, to spend money on some of its major projects which it deferred while it was solving its foreign exchange problem, and I think that is why we're seeing the rapid expansion of American exports in the first half of this year.

American companies have done quite well in China, despite a number of handicaps. We have consistently held about 12 percent of China's growing trade, despite a very strong dollar, until recently, and an export licensing system, to which Mr. Minetta referred, which in practice is far stricter than that of our competition.

American companies have done well because there is a strong match between American capabilities and Chinese priorities, down the whole line from energy production, energy conservation, power generation, transportation, our aircraft industry, electronics, food processing. You can go right down the list. We are either competitive or preeminent in all of the areas of China's highest priority development programs.

Now we have the advantage, for the first time in our trade with China, of having a cheaper dollar and an export control system which, with the glaring exception of the telecommunications industry, is beginning to be brought into line with U.S.-China policy and the practices of our competitors.

The removal, or at least the amelioration, of these obstacles to American competitiveness in China comes at a time when China is resuming major purchases, and so for these reasons, we expect to see U.S. sales to China contributing to America's current worldwide export boom.

Under these encouraging, or at least hopeful, conditions for international business in general, and China trade in particular, I believe that American business has two legitimate requests to make of government, and this is really the main point of my statement:

First of all, continue the process of removing unnecessary restrictions on doing business abroad. American companies are virtually shut out of the telecommunications market in China, despite the fact that we have lower prices and better technology because of export control restrictions. China is already spending over $1 billion a year on telecommunications equipment imports, and China is only at the beginning of phase 1 of a plan to build a modern communications system. If we don't act, and act soon, this window of opportunity for American companies will close as our European and Japanese competitors help design the system, and thus skew the specifications in their favor.

The second request I think business would make to government is to be careful not to create new obstacles to companies manufacturing in the United States, employing American workers, and paying U.S. taxes.

The issue before this committee today is one that must be handled very carefully, I think, to avoid doing precisely that. Now you did not ask me here to comment on the question of whether the interests of the United States require the preservation of an independent private sector launch capability. You have far more expertise in that area than I. But if you conclude that the United States has such an interest, I would urge you, in the strongest terms, not to seek to accomplish that purpose by use of the export licensing system.

It has been the consistent policy of the United States to use export controls to the minimum extent necessary to prevent leakage of sensitive military or dual use technology to enemies or potential enemies of the United States.

The Administration has determined, first of all, that China is not an enemy; secondly, that there is no such risk in this case. So should the license be turned down on other grounds? The United States has never, to my knowledge, used the export licensing system for protectionist purposes or to create a competitive advantage. We expect other countries to adhere to the same standard. If this license is granted, we would expect France to consider the case when it gets to COCOM on its merits as an export control matter, and not to vote in a way that would give Ariane competitive advantage.

We ask the United States Trade Representative to act vigorously on any evidence that other countries are misusing product safety regulations or health standards for protectionist or anti-competitive purposes. For us to start down that road ourselves and use export licensing procedures for purposes the regulations were never intended to serve would be contrary to our broader competitive interest. It would invite retaliation and imitation and endanger our current export boom and our hopes of eliminating our massive trade deficit.

Finally, I think it would almost make less likely the chances that we would be able to work out arrangements not only with China, but with other countries already participating in the launch business and countries that are or will be entering the launch business, to have an international regime within which American companies can compete.

Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Sullivan follows:]

Testimony before the House Committee on Science, Space and Technology

September 23, 1988

Roger W. Sullivan
President, US-China Business Council

Mr. Chairman and members of the Committee on Science, Space and Technology. I want to thank you for inviting me to appear before this committee as you consider the Administration's notification of its intent to approve the license application submitted by the Hughes Aircraft Co. for the launch of its satellites by Chinese space launch services.

I am Roger Sullivan, President of the US-China Business Council, a private, membership organization of American companies engaged in trade or investment in the People's Republic of China. We are funded almost entirely by membership dues and research and publication income and have no organizational or financial links with China. Our purpose is to serve the informational needs and represent the interests of American companies doing business with China. The Hughes Aircraft Company is one of our members as are Martin Marietta and McDonnell Douglas.

Despite the obstacles and frustrations involved in trying to do business with China, American companies have done quite well and expect to do a lot better. Trade has gone from less than $300 million in 1972 to over $10 billion in 1987 making the United States China's third largest trading partner after Hong Kong and Japan. Since 1983 over 300 American companies have invested in China, with total commitments now approaching $3 billion. If one does not count Hong Kong, which is a special case, the United States is the largest foreign investor in China. Over the long term it appears that our growing trade will tend to be balanced trade. We ran surpluses with China until 1982 because in those early years China needed to purchase large quantities of agricultural products. From 1982 to 1985 our trade was in approximate balance. In 1986 and 1987 China ran large surpluses. This year, however, we will see the gap begin to narrow once again. In the first half of this year American exports to China have surged 46% while China's exports to the US have increased about 20%.

We are confident that the expansion of American trade and investment in China will accelerate over the next several years for a number of objective reasons. China is now, and is likely to remain for some time, the fastest growing economy in the world. This is not just our judgment but a consensus of economists in the international financial institutions and the private sector. The most recent assessment comes from Moody's Investors Service which, in a September 19 press release summarizing a report to be released this week, comments that Moody's believes that "the liberalization of (China's) economy initiated by Deng Xiaoping ten years ago is now deeply rooted and strong enough to survive even in Mr. Deng's absence." After considering all the positive and negative factors affecting China's economy, Moody's concludes that "China will easily exceed its target growth rate of 7.5% per year for the 1986-1990 period---and will be on a firm course to surpass its goal of quadrupuling national income during the period 1980 to 2000."

China recovered quickly from two years of substantial trade deficits in 1985 and 1986. Foreign exchange reserves increased modestly in 1987 and are rising again in 1988 putting China into a position where it can safely resume major projects that had to be postponed when China's reserves fell sharply. Because it follows a conservative borrowing policy, China has a debt service ratio of only 10%, well below that of other Asia nations. As a consequence it also has a strong credit rating.

As I said at the outset, American companies have done quite well, holding about 12% of China's growing trade despite the obstacles of a strong dollar and an export licensing system which in practice is stricter than that of our competition. American companies have done as well as they have because there is a strong match between China's priorities and American capabilities. In energy exploration, development and conservation, electronics, transportation (particularly aircraft and railroads), food processing, power generation (whether thermal-hydro or nuclear)--in short in all the areas of China's highest economic development priorities, we are at least competitive if not preeminent. We now have the advantage of a cheaper dollar and an export control system which, with the glaring exception of the telecommunications area, has been brought into line with US China policy and the practice of our competitors. The removal or at least amelioration of these obstacles to American competitiveness in China comes at a time when China is resuming major purchases. For all these reasons we are seeing US sales to China contributing to America's current export boom.

Under these encouraging or at least hopeful conditions for international business in general and China trade in particular, I believe American business has two legitimate requests of government: first, continue the process of removing unnecessary restrictions on doing business abroad. American companies are virtually shut out of the telecommunications market in China despite our lower prices and better technology because of export control restrictions. China is already spending over $1.0 billion a year on telecommunications equipment imports and China is only at the beginning of phase 1 of its plan to build a modern communications system. If we do not act and act soon this window of opportunity for American companies will close as our European and Japanese competitors help design the system and skew the specifications in their favor.

The second request to government is be careful not to create new obstacles for companies manufacturing in the United States, employing American workers and paying US taxes. The issue before this committee today is one which must be handled carefully to avoid doing precisely that. You did not ask me here today to comment on the question of whether the interests of the United States require the preservation of an independent, private-sector launch capability. You have far more expertise in that area than I. But if you conclude that the United States has such an interest, I would urge in the strongest terms that you not seek to accomplish that purpose by use of the export licensing process.

It has been the consistent policy of the United States to use export controls to the minimum extent necessary to prevent leakage of sensitive military or dual-use technology to enemies or potential enemies of the United States. The Administration has determined that there is no such risk in this case. Should the license be turned down on other grounds? The United States Government has never to my knowledge used the export licensing system for protectionist purposes or to create a competitive advantage. We expect other countries to adhere to that same standard. If this license is granted, we would expect France to consider the case in COCOM on its merits as an export control matter and not to vote in a way that would give Ariane competitive advantage. We ask the United States Trade Representative to act vigorously on any evidence that other countries are misusing product safety regulations or health standards for protectionist or anti-competitive purposes. For us to start down that road ourselves and use export licensing procedures for purposes the regulations were never intended to serve would be contrary to our broader competitive interests. It would invite retaliation and imitation and endanger our current export boom and our hopes of eliminating our massive trade deficit.

The CHAIRMAN. I thank the distinguished gentleman.

The Chair would now recognize the distinguished Ambassador Hummel, former Ambassador to the PRC. Welcome, by the way.

Mr. HUMMEL. Thank you very much, Mr. Chairman.

I am pleased to be invited. My credentials are I think I could fairly call myself an expert on China, having spent a lot of time—

The CHAIRMAN. Ambassador, could you please pull your microphone a little closer.

Mr. HUMMEL. Having spent a lot of time involved with China as a youth, and in my Foreign Service career, I am retired from the Foreign Service, I speak here today as a private citizen with some knowledge of China. I was ambassador in Beijing from 1981 to 1985.

Let me just say very briefly, the outline of American relations with China, I think is familiar to everybody, and has been touched on by previous witnesses. I won't go into that.

We have engaged China in a very interesting and fruitful dialogue, bringing China—helping to bring China into closer association with the international economic system and with the Western world.

This process is valuable to us as well as to China, and throughout this process, we have kept firmly in mind our own American interests.

What we have here today, this issue, is of course where American interests lie in this technology, in this export license. And it is not the issue of what would be nice for our relations with China.

Now the decision, I believe, by the Executive Branch, is I believe fully protective of our own interests, and finally, I would simply say that in this case, as in others, in this competitive world, we should not overestimate our American ability to play a decisive role in the long-term picture. We need to disabuse ourselves of any idea that we can stop China from continuing to develop and use its satellite launch capability, and we have to realize here, as we should see with better clarity in many other situations, that our ability to determine the course of events is not unlimited.

In many recent cases, specifically, the denial of U.S. export licenses has not served to prevent China from getting the same technology elsewhere, and moreover, has only served to lose for the United States the export benefit.

In this case, too, we would lose the ability to negotiate a valuable agreement with the Chinese involving the fairness of their pricing of launches. This is my general viewpoint.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Mr. Ambassador.

Now we have Mr. Suttmeier.

Mr. SUTTMEIER. Thank you, Mr. Chairman.

My name is Richard Suttmeier, and I am a Professor of Government at Hamilton College. I have spent a number of years studying the Chinese science and technology issues, worked two, three years ago with the Office of Technology Assessment on a project dealing with technology transfer to China, and most recently completed a year in Beijing representing the National Academy of Sciences Committee on Scholarly Communications with the PRC.

You have a very full agenda, Mr. Chairman, so I also will try to be brief. I would like to make four points:

One, we should, I think, recognize at the outset that China's science and technology capabilities are improving quite rapidly. China will be an important player in certain fields of science and technology by the end of the century, if not before. China's number of scientists and engineers working in Chinese research and development is quite substantial by international standards, something on the order of 600,000. China is now beginning to spend approximately 1.5 percent of its GNP on research and development, which again, indicates a significant growth.

What is interesting, I think, about some of the patterns of Chinese expenditures on technical matters is the relatively low cost that—relatively low cost of technical manpower, something which does in fact pertain to your concerns about pricing. The cost of Chinese technical manpower currently is low, perhaps one-eighth of what one would see in Japan. They are likely, in my view, to increase, but for the time being, China enjoys a cost advantage in the export of technology and technical services.

Number two. A relative decline in the percentage revenues going to science and technology from the state budget, going to research institutes and high technology enterprises, has introduced a strong incentive for these units to seek revenues through commercial sales, both domestic and international.

This is especially true for the defense industry, which had enjoyed privileged access to manpower investment in the past, but which now has seen its domestic market shrink as a result of reduced military spending in China.

Three. China thus has a respectable level of technical capability; and policies to accelerate the enhancement of that capability. I would note in particular the recent new high technology initiative, which does in fact include the space industry. I have a description of that program if the committee would find it useful. It has policies to accelerate the enhancement of its capabilities, and strong incentives for the commercialization of its technology and technical services on the world market. It seeks and has found many willing partners in science and technology cooperation. Though the U.S. remains a valued partner, its relative importance in Chinese eyes has declined over the past decade.

Four. The issue of provision of Chinese launch services for U.S.-made satellites should be seen, in my view, in this larger context. The launching of the satellite by the Chinese will provide benefits to the Chinese space industry, but the progress of the latter ultimately is not solely dependent on the former. China's S&T progress, independent of the United States, is likely to be seen in a variety of other areas of science and technology as well. This will not be the last time, I suspect, that the U.S. will have to face hard decisions resulting from the progress of Chinese science and technology.

In my view, the United States must be better prepared to face the future challenges which are to come, not only in space, but I think in other areas as well. While maintaining a commitment to assist in Chinese science and technology development, government, industry and the academic world must all come up with strategies for increasing the benefits to the United States from U.S. S&T cooperation, and from the progress in S&T which China is likely to experience over the next decade.

I think in conclusion, Mr. Chairman, I would just note that we are completing the first decade of bilateral cooperation, and I would suggest that in this decade, conditions have changed rather markedly. We began the decade with clear U.S. international dominance in science and technology, certainly in the perceptions of the Chinese. We began the decade with a relative backwardness of Chinese science and technology resulting from the Cultural Revolution, and we approached the relationship with China largely in bilateral terms. I would say that all three of these conditions have now changed. In Chinese eyes, as well as probably objectively, U.S. technology hegemony is no longer what it once was.

Second of all, China has made very rapid progress to overcome the decade or so of Cultural Revolution interruption. Quite remarkable, when all is said and done.

And thirdly, as I think a number of members of the committee have rightly pointed out this morning, the issues are no longer simply bilateral. We have clearly China interacting with countries of the OECD world, but I would suggest that we must also become increasingly sensitive to Chinese scientific and technical relations with the newly industrialized countries, including Brazil, in the space area, but in a variety of other industries with Singapore, Hong Kong, and I do believe we will see new cooperation with South Korea, as well.

Thank you, Mr. Chairman. I have a longer statement which I can make available.

[The prepared statement of Mr. Suttmeier follows:]

REMARKS TO THE COMMITTEE ON SCIENCE AND TECHNOLOGY
HOUSE OF REPRESENTATIVES, U.S. CONGRESS
FRIDAY, SEPTEMBER 23, 1988

RICHARD P. SUTTMEIER
PROFESSOR OF GOVERNMENT
HAMILTON COLLEGE
CLINTON, N.Y.

Mr. Chairman, it is a pleasure to be with you here this morning. My name is Richard P. Suttmeier. I am currently a professor of political science at Hamilton College, Clinton, NY. I speak to you as one who has been interested in Chinese scientific and technological development for about 20 years. Three years ago, I was asked to come to Washington to help in the preparation of 1987 Office of Technology Assessment study, Technology Transfer to China. From January to December 1987, I served as the Director of the Beijing Office of the National Academy of Sciences/Committee on Scholarly Communication with the People's Republic of China. In this capacity I had frequent opportunities to interact with members of the Chinese scientific community, and with those responsible for the development of S&T policies. I am currently engaged in a research project for the National Science Foundation designed to improve our understanding of the patterns of S&T development in the countries of the East Asian region, including China. Twenty years ago, I also worked in the Office of International Affairs at NASA.

Mr. Chairman, you have a very full agenda, so let me be brief. I would like to make four points:

1. China's S&T capabilities are improving rapidly, and China will be an important international player in certain fields of science and

technology by the turn of the century, if not before. The costs of Chinese technical manpower are currently low. Though they are likely to increase, for the time being, China enjoys a cost advantage in the export of technology and technical services.

2. A relative decline in the percentage of revenues from the state budget going to research institutes and enterprises has introduced a strong incentive for these units to seek revenues through commercial sales, both domestic and international. This is especially true of the defense industry which enjoyed privileged access to manpower and investment in the past, but which now has seen its market shrink as a result of reduced military spending.

3. China thus has a respectable level of technical capability, policies to accelerate the enhancement of that capability, and strong incentives for the commercialization of its technology and technical services on the world market. It seeks, and has found, many willing partners in S&T cooperation. Though the US remains a valued partner, its relative importance in Chinese eyes has declined over the past decade.

4. The issue of the provision of Chinese launch services for US made satellites should be seen in this larger context. The launching of the satellites by the Chinese will provide benefits to the Chinese space industry , but the progress of the latter is not solely dependent on the former. Chinese S&T progress, independent of the US, is likely to be seen in a variety of other areas of science and technology as well.

This will not be the last time the US will have to face hard decisions resulting from Chinese S&T progress. The US must better prepare itself for the future challenges which are sure to come. While maintaining a commitment to assist in Chinese S&T development, government, industry and the academic world must all come up with strategies for increasing the benefits to the US from US-Chinese S&T cooperation, and from the progress in S&T which China is likely to experience over the next decade.

1. Chinese leaders have assigned to science and technology a key role in the country's modernization drive. Many problems remain to be solved before the technical community can play the role expected of it. Yet significant beneficial change has occurred during the last decade, and China will enter the 1990's with a system for the promotion of S&T which will be quite respectable by international standards. Although statistical indicators of the Chinese levels of effort in support of S&T are subject to a range of interpretations, and must be used with care, the data is getting better and does allow us to see the contours of the Chinese S&T system more clearly.

According to recent data published by China's leading think tank for science policy, Chinese S&T manpower grew at the rate of 7.7% in the period 1979-85. This growth leaves China with an S&T manpower pool of over 8 million people, which, allowing for considerable qualitative variation, is quite a sizeable technical community. Of these, approximately 605,000 scientists and engineers are employed in R&D. While small when compared to the country's population as a whole, this is a sizeable R&D contingent by international standards.

Spending for R&D has also grown. China now spends about 1.5% of its gross value of industrial and agricultural output on R&D (some RMB 15.37

billion, or approximately $US 4.14 billion). R&D spending by the state increased at the rate of 6.3% during the 1979-83 period, a rate which did not keep pace with the rate of economic growth. New revenues streams have had to be found, and this has led to a drive for the commercialization of research, technological development and technical services. Technological entrepreneurship is increasingly valued, legitimated and encouraged in today's China. This entrepreneurship is seen in both established state-owned industry, such as space, and in a spate of new non-governmental or quasi-governmental high-technology enterprises. In the context of China's "open" policies, this commercializtion has an inceasingly international dimension, with China seeking to expand its exports of technology and technical services.

When we look at the composition of Chinese R&D spending, we see that personnel costs account for a relatively low 16% of the total (with other operating expenses, capital construction and other asset acquisition accounting for the bulk of the expenditures). The annual R&D expenditure per scientist or engineer working in R&D in 1986 was approximately RMB 30,000, or about $US 8,000. According to Chinese estimates, this would be about 1/8 of the per researcher expenditure of Japan and about 1/2 that of the USSR.

On the face of it, for those operating in the international marketplace, China might not seem an obvious source of technology, research, and technical sevices. Yet, if we recall China's serious 30 year commitment to S&T development and its large technical community, and if we consider what appear to be very low cost professional manpower services, we may have to reconsider China's role.

2. The 30 year commitment to S&T, noted above, has been marked by great variation. For much of the period since the late 1950's, defense-related R&D, and defense-related industry, claimed very large portions of the nation's investment. This resulted in large concentrations of high quality technical manpower and facilities in the defense sector, and allowed China to make technical accomplishments in such fields as nuclear weapons and rocketry.

China's threat perceptions, and thus its defense orientation, today are quite different from what they were in the Maoist period. Thus, there has been a significant reduction in military expenditures in recent years (although defense-related R&D may be rising). China has been left with a large military industrial complex with fewer domestic customers. This has led to a policy of "civilianization" of much of the defense industry; a turning of the resources in the defense sector to production for civilian purposes. This clearly has been the case in the space industry.

The latter, with its record of accomplishments under often difficult conditions, takes pride in being a kind of flagship industry for the new "high-tech China" to which the leadership is committed. Of course, not everyone in China believes that China in the short run can afford a high tech future, and even among those who would like to see their country move in that direction, not all are convinced that a national space program is the way to go. Such hesitation stems from the fact that China is a poor country, and in the views of some, cannot afford a program which analysts in the West have estimated as costing some $US 1.5 billion per year.

In spite of a lack of consensus on the importance of space, the industry continues to develop ambitious goals, including the those of enhanced launch vehicle capabilities and of manned space flight. Space technology has also been included as one of seven priority areas in China's new high technology promotion program.

3. During the last decade China has aggressively sought to expand its international S&T relationships. The US has been a valued partner in this process, and arguably, has been that nation with whom China has had the most extensive ties. Yet, however valuable its ties with the US in S&T, China does not regard US-China relations as precluding the development of a wide range of ties with other countries. Its relations with the other countries of the OECD world are of considerable importance to China, and these countries often offer opportunities to meet China's objectives on terms which are more favorable to China than those offered by the US. We should also be sensitive to the growing importance of China's technical ties to other newly industrializing countries. Hong Kong and Singapore, for instance, are exploring S&T relations with China, and I believe such thoughts are in the minds of the South Koreans as well. In the area of space, China reportedly is exploring with Brazil, for example, the possibility of jointly developing satellites to be launched in the early 1990's.

4. Mr. Chairman, I have not directly addressed the issues which concern you today, namely the implications of the Administration's decision to permit the export of US made satellites for launch by China on Chinese made launch vehicles. One could, I believe, see this decision as being quite consistent with the evolution of US policy towards China. This policy

has encouraged US-China trade and S&T cooperation, has liberalized export controls to further that cooperation, and has sought to encourage within China the evolution of more liberal political and economic orders. With regard to the latter, in particular, US policy has sought to encourage the emergence of a market economy and the active participation of China in the liberal international economic order. In many ways, this policy has been remarkably successful, and the decision to allow the satellite exports could be seen as indicative of that success.

As we know, however, successful policies often generate a host of new challenges, and successful policies in one area at times conflict with policy intentions in others. I daresay, Mr. Chairman, that the issue which you confront today will not be the last to arise from China's quest for the development of its S&T. As noted above, China in 1987 launched an ambitious program for the development of high technology. If you have not yet seen the outline of this program, I will leave a copy of it for the Committee's reference. It calls for activities in areas which we, the Europeans, the Japanese, and the Asian NIC's, all regard as crucial to our future wealth and power. The Chinese program includes efforts in biotechnology, space, information technology, laser technology, automation, energy technologies and advanced materials. Although not officially included in the high-tech program, a Chinese national program in superconductivity also exists and superconductivity is a field in which the Chinese have already done world class basic research. Given these trends, it would be foolish to underestimate the Chinese presence in the development of these industrial fields. Our current concern over Chinese space capabilities should alert us to the liklihood of new challenges from other areas of technology in the future.

The prospect of increasing Chinese scientific and technological prowess need not be taken as invalidating the assumptions of our China policy. It should, however, cause us to reexamine our expectations about that policy for the 1990's and beyond. We must, I believe, make a conceptual shift from the current policy tenets that "China's S&T development is in our interest, and therefore we should support it" to the interrogative, "if China's S&T development is thought to be in our interest, how do we devise a strategy to benefit from it in an increasingly competitive world in which the US no longer enjoys economic, technological and scientific positions of hegemony?"

Time does not permit a careful analysis of the implications of such a conceptual shift. For one discussion of some of the issues pertaining to the space industry, I would call your attention to the informed and suggestive study, Satellite Telecommunications Technology Transfer to China, prepared for OTA as part of the technology transfer to China study noted at the outset. For a more general discussion of the prospects for Chinese S&T development, and the implications for the US in the 1990's, I submit for the record the page proofs of an article of mine which will appear on October 7 in the Fall, 1988 issue of Issues in Science and Technology.

Thank you Mr. Chairman.

The CHAIRMAN. Let me thank you for your presentation. I think you are all centering, all of you have centered around the issue, which I think is a very important one that you're raising, is what is the potential of the marketplace in the Asiatic area? And I think when we look at the enormous economic expansion, if you'd like, of Japan, and their economy, and then we take a look at what's happened in Korea, which is another economic miracle taking place in that, and I think the Ambassador pointed that out, is that the potential marketplace for the future of the United States trade and balance of payments and economic growth and so forth, in large measure is going to lie in the Pacific Rim countries. Would you agree to that point of view? Ambassador?

Mr. HUMMEL. Yes, indeed, Mr. Chairman. I certainly do agree with it. I would emphasize it by pointing out that our total trade with East Asia has some years ago, two or three years ago, already surpassed our total trade with Western Europe. This is a good indication of how our interests are shifting to include much more emphasis on the competition from and the cooperation with the Far East.

The CHAIRMAN. So as we are looking over and down the road, that's why this whole discussion today is so vitally important. One should not throw away the baby with the bath water, and I think that is a fair statement to make here, because in any country that we are dealing with, including Australia—and they will be testifying next—it seems to me that we are looking to build bridges and grow. That's what we've been doing in China in the first place.

In the second place, we come back—and I'm going to ask McDonnell Douglas this question, and you might as well get prepared for it—it has to do with the point that we are doing a billion dollars worth of joint development in aircraft with them. And I wonder if there's any transfer of technology involved there. If there isn't, we're not doing a very good job at all. I would assume we'd want to develop the most advanced aircraft we could possibly develop. Maybe we can learn something back in return.

Where I'm coming from is—and I think it's imperative that the Congress understands it—if we look to the 1992 date in Europe, and we come to the consolidation of that market situation there, America better look very broad and very far throughout this world, in my judgment, as to where our trading partners are going to be 10 years from today. And I don't know whether you agree with that or not. I think it's important, and I'd like to have some observation of that.

Do you see that as the marketplace of the future?

Mr. HUMMEL. Yes, sir. I see enormous opportunities for American trade. I also see, to be perfectly frank, a lot of competition and additional players will emerge. We already know that after Japan, we now have the smaller tigers, as they are called in South Korea and Taiwan and elsewhere. But sooner or later, you are going to add other countries as well. In time China's going to be one, and there's no way in which we can stop this and, in fact, it is up to us to figure out how to live with the new situation that is going to occur.

This situation will be a much higher tech China with exports that compete with ours, much more than they do now, and in fact, with exports that compete, China and Korea and Japan are all going to be in competition.

We haven't done a very good job nationally in adjusting to the facts of international economic life in the last decade. We are going to have to do better. But one of the keys to it is going to be cooperation with other countries, so that we can maintain a share of our own markets.

Perhaps Mr. Sullivan, who is directly involved with an organization that does talk about trade, would have some other observations.

The CHAIRMAN. Well, I'm taking too much time, but let me just make this point:

It seems to me that as we look at the economy of this country, and we are all doing that right now, that's what we're campaigning on, we're looking at what's going to happen next year. The balance of trade payments has really knocked our socks off in the last five or six years. It's a very major element as far as our whole economic structure in this country is concerned, in my judgment, and we are talking about lowering that deficit, we all know that to be a critically important area. And our domestic needs are increasing all the time, and the social needs of our people, people are living longer, it's more Medicaid, more help, and blah, blah, blah.

Seems to me that we have got to look to science, space and technology for the products of the future and the new wealth of the future is going to come from that area. I don't think there's any question about that, or the debate wouldn't even be held today vis-a-vis the issue of transfer of technology.

But the one area where we're going to be forced to compete is in that balance of trade payments. If we don't bring that down, that's just as bad, in my judgment, for the economy of this country as it is with the deficit we have raised in our budgetary process. And it seems to me that we should do all we can, without giving away the store, so to speak, in protecting our national interest, to be able to develop the broadest marketability that we can possibly do, as far as this country is concerned.

I just wanted to make that statement.

The Chair recognizes the distinguished gentleman from New Mexico, Mr. Lujan.

Mr. LUJAN. Thank you very much, Mr. Chairman.

Back on the question of a level playing field, is this the only product that we're looking at in this? Are we having problems in other areas that we addressed, that issue with other products, as far as China is concerned?

Mr. SULLIVAN. Well, first of all, I think the issue of the level playing field is grossly exaggerated. I mean there is a real oversimplification here in talking about nonmarket economy versus a market economy. Clearly we wouldn't be talking here about protecting our aerospace industry if we weren't—if we were a fully market economy. But be that as it may, the Chinese have moved a long way toward reliance on market forces, and it's very interesting. If you look at what is going on in China, you can draw demand curves in the Chinese economy, and when prices go up, demand goes down. The Chinese cannot assume they can automatically manufacture something in China that's cheaper than what anybody else can manufacture. They have a tough time competing in the world.

American companies that are building factories in China and trying to compete in the world with the products of those factories are having a tough time competing in the world. But the fact remains that China is far less a market economy than we are, if you want to put it that way, and therefore there are problems, which is why we have things like anti- dumping laws and so forth, to protect against unfair trade practices.

But those problems can be managed and can be managed far better through opening up your relationship and negotiating agreements, which we have done quite successfully since 1972 with China, rather than by just simply, looking at this bugaboo of a non-market economy and saying we can't compete. The heck we can't compete! We can compete very well.

Mr. LUJAN. Well, that may be very true, but my understanding is that the launch services, the price that they are going to charge for the launch services on these three satellites, is significantly lower than any U.S. company would have to charge.

Mr. SULLIVAN. One of the initial launches Ariane did was for nothing. That's significantly low, also. I mean, in other words, this is not limited to a non-market economy. Everybody plays this game, and to the extent they play it unfairly, you know, we should be, as we are, working with the Japanese so they don't do that to us, and with the French, so they don't do it to us, and with the Chinese, so they don't do it to us.

But what I'm saying here is that—

Mr. LUJAN. Okay, well, how do we do it then?

Mr. SULLIVAN. But you don't do it through the export administration system. That's an abuse of the system, because as a number of people have commented today, if this were Japan or France, we wouldn't even be having this hearing, the license would have been granted.

So we do it, we do it in the course of the negotiation of our broader commercial relationships with all of these countries. We are doing it now in the process of preparing our case for China's admission to the GATT. We are saying to the Chinese, there are certain terms that are required. I mean, you have to behave in a certain way. If you're going to be part of the international economic environment. And the Chinese are learning and being drawn into this international economic environment, and behaving a lot better than they did before, and a lot better than some other countries who are supposedly friends of ours, that I could mention.

Mr. LUJAN. I think we would be having these hearings, no matter who it was, because, you know, there's a second interest here, other than just doing business with China. The second interest is that this committee has had in developing a strong, private ELV launch system, and that's—

Mr. SULLIVAN. Well, I'm sorry, sir, yes, you probably would have had hearings, but you wouldn't have received the notification from the Administration of its intent to issue a license, because no license would have been required.

Mr. LUJAN. Yes, that's true.

The CHAIRMAN. That's true.

Mr. LUJAN. Well, that being the case, you see, those things are taken care of, what advice would you give then to the State Department as to how to ensure that there is a level playing field?

I guess what you're saying is that there's an opening day sale on these first three, and that's why they're so low, and that the future will be a little—

Mr. SULLIVAN. Well, I'm not that optimistic. You may be quite right, that there's a bigger problem than that. I'm just saying it could be that, it could be that they are unfairly pricing. But what I'm saying is, that you can take care of that, because we have so much leverage back and forth in this relationship, covering a whole range of commercial issues. The Chinese want to be in GATT, they want our support in GATT, the Chinese want a growing economic relationship, we want a growing economic relationship, too.

All I'm saying is that we don't need to use the subterfuge of denying an export license in order to protect our other interests.

I think, if I may just add, there are some very interesting things going on here. You know, Asia is changing dramatically. Asia is growing, as we all heard, dramatically. China is growing most dramatically of all. There are great changes going on in the United States, too. We shouldn't be intimidated by our trade deficit in the past. We are becoming a major exporting nation again. I mean the trade deficit, in my view, is yesterday's problem.

The problem now is—

The CHAIRMAN. But if the gentleman would yield, it's yesterday's problem because we're doing something about it, but it can surely become tomorrow's problem if we don't continue doing something about it.

Mr. SULLIVAN. I agree with that, sir, and the thing that we should not do, at a time when we are becoming a major exporting economy, is to throw obstacles in the way of succeeding.

The CHAIRMAN. Are there further questions from any members of the Committee?

Mr.Mineta, the distinguished gentleman from California.

Mr. MINETA. Mr. Chairman, I would like to thank Mr. Sullivan for his comments relative to the proper use of the export license, the export licensing system. I think it is important that we keep in mind what that process itself is all about because the licensing system, it seems to me, is designed to deal with questions of technology. However, it has been used by this Administration for political and economic reasons as well. I think that was my point earlier

We have got obsolete technology and because it may be going to Romania or Bulgaria or somewhere, all of a sudden the license is denied and it is because someone has some prejudice against wanting to export something to Bulgaria, for instance, or Yugoslavia.

So we have used, unfortunately, the export licensing system for political purposes and I just hope that—and in this instance I think it is interesting this morning in terms of Department of State and Department of Defense we had the political people here. We didn't have the technology people from those departments before our Committee this morning. It was the political one. I am wondering now is this a political decision that is being made relative to this license rather than a technology issue and I did want to just say that I wanted to thank you for your comment on the proper use of the licensing system because we from Silicon Valley have had obsolete technology being turned down for licensing for political reasons.

Thank you very, very much again.

The CHAIRMAN. Are there any further questions from any members of the panel?

[No response.]

The CHAIRMAN. All right. We want to thank you very much for your input. It has been extremely helpful. I think you have painted a much broader picture which has to be considered and we appreciate that.

Well, we were going to go and vote, regrettably, but that's a job too—but our next witness is going to be Mr. Richard Johnson, General Manager of AUSSAT from Sydney, Australia.

Is Mr. Johnson here?

Mr. Johnson, you can come up and get yourself organized and if you have anyone you want to sit with you.

Also we are going to go and vote and come right back but some of you who may want to get something to eat—where is this place, now?

There is a carry-out down in the basement, but don't the witnesses go away because we are going to want you here—so we'll be right back. We'll be back and the meeting will continue. Mr. Johnson, you'll be up next.

[Brief recess.]

The CHAIRMAN. The hearing will re-convene and when we broke up last we had—our next witness was Mr. Richard Johnson, General Manager of the AUSSAT from Sydney, Australia.

Do you have any colleague with you, Mr. Johnson?

Mr. JOHNSON. Thank you, Mr. Chairman.

The CHAIRMAN. Would you identify your colleague for the record, please?

Mr. JOHNSON. My colleague is Mr. John McCarthy, a Minister for Congressional Affairs at the Australian Embassy in Washington.

The CHAIRMAN. Mr. John McCarthy, okay. Now if you could go ahead and proceed, we have your statement but I think in view of the fact that you are one of the major—you'll pardon the euphemism—characters in the play, it might be well that you would go through your full testimony. I think it is worth it.

STATEMENT OF MR. RICHARD JOHNSON, GENERAL MANAGER, AUSSAT, SYDNEY, AUSTRALIA; ACCOMPANIED BY MR. JOHN McCARTHY, MINISTER FOR CONGRESSIONAL AFFAIRS, AUSTRALIAN EMBASSY.

Mr. JOHNSON. Thank you, Mr. Chairman. In fact, I have a shorter version of the statement I would like to make if I may.

The CHAIRMAN. Your testimony will appear in full in the record and you can go ahead and summarize.

Mr. JOHNSON. Thank you very much. Mr. Chairman, I am the General Manager of AUSSAT Pty. Ltd., which is a company owned 75% by the Commonwealth of Australia.

The CHAIRMAN. One more time, let's get that again.

Mr. JOHNSON. Mr. Chairman, I am the General Manager of AUSSAT Proprietary Limited, a company owned 75% by the Commonwealth of Australia. AUSSAT very much appreciates this Committee's interest in the proposed arrangement between Hughes and AUSSAT and welcomes the opportunity to present testimony today. Indeed, I travelled from Sydney to Washington this week for the sole purpose of being present at this hearing.

Mr. Chairman, AUSSAT's charter in brief terms is to operate commercially in providing telecommunications services by satellite as an important element of the Australian telecommunications infrastructure. There is no other Australian entity able to offer satellite telecommunications services.

Our customers include the Australian broadcasting industry, which contributes some 65% of our annual revenue and the aviation, finance, mining and other industries.

The issue being addressed by this Committee arises because of AUSSAT's need to replace in the 1992-93 time frame two of our existing three operational satellites. Tenders were called in September, 1987 on the basis that the selected contractor would design and construct the satellites and also arrange for the launch and delivery in orbit.

A central theme of the tendering arrangements was AUSSAT's need for continuity of service in the transition from its existing satellites to the replacement system. Unlike the case in this country, there is no other satellite operator from whom capacity could be obtained in the event of delays in establishing our replacement system.

Four tenders were received, three from U.S. companies, namely Hughes, Ford and General Electric and one from Europe, a consortium led by British Aerospace. All four tenders were highly competitive.

During 1987 China had begun the process of seeking to establish its Long March rockets in the world market for satellite launches and spoke of low introductory prices. At that time both the U.S. and the European launch industries were seeking to recover from launch rocket failures.

A policy of promotional pricing in our view is not new in the satellite launch industry. NASA offered half-price launch services on the Shuttle for a three year introductory period between 1982 and 1985 and the first launch of an upgraded Ariane rocket, the Ariane 4, was offered recently at about 20 percent of normal pricing.

In the event the tenderers offered us that use of a range of alternative launch vehicles and all four offered us the Long March. The effect of China's low introductory pricing was to reduce our prospective system establishment cost by around $80 million or about 20 percent of the system price.

Hughes was selected for contract negotiation and we signed a contract with Hughes in August, 1988. Under that contract the price benefits of the Long March launch apply to AUSSAT as do any associated risks.

AUSSAT regards itself as a strong supporter of the U.S. aerospace industry. This contract with Hughes brings to five the number of satellites now ordered from the U.S. Two of those were launched on the U.S. Space Shuttle and one on the European Ariane.

Counting this new contract we have spent close to half a billion dollars with the U.S. aerospace industry. In every case our decision on contractor selection was made on commercial grounds. We seek to continue that process in our desire to use the Long March rocket for our next two launches.

AUSSAT believes that the technology transfer issue can be managed and believes also that the prospect of low introductory pricing for the Long March does not constitute predatory pricing.

Pricing has already been set by the Western launch industry in both U.S. and Europe.

Mr. Chairman, AUSSAT seeks your Committee's support for the issue of the relevant export license to enable AUSSAT's next generation satellites to be launched on the Long March rocket.

[The prepared statement of Mr. Richard Johnson follows:]

·AUSSAT PTY LIMITED
AUSTRALIA'S NATIONAL SATELLITE SYSTEM

TESTIMONY BY

RICHARD C. JOHNSON

GENERAL MANAGER (AUSSAT PTY. LTD.)

TO

THE HOUSE COMMITTEE ON

SCIENCE, SPACE AND TECHNOLOGY

23 September, 1988

AUSSAT PTY LIMITED
AUSTRALIA'S NATIONAL SATELLITE SYSTEM

Mr. Chairman,

AUSSAT Pty. Ltd. appreciates the opportunity to appear before, and present testimony to, this Committee today. The issue is of importance to AUSSAT and the decision of your Committee to establish this hearing is welcome.

AUSSAT Pty. Ltd.

AUSSAT is a government-owned Australian company, providing telecommunications services via satellite in the Australian marketplace and in New Zealand. The company is required by its shareholders to operate on a fully commercial basis.

The services and facilities provided by AUSSAT are a fundamental part of the Australian telecommunications infrastructure, with AUSSAT's major customers being drawn from the broadcasting, aviation, finance, mining, press and other industries. Satellite telecommunication systems have characteristics which contribute heavily to the reduction of the tyranny of distance in a country of Australia's size, vast remote areas and widely spread population. AUSSAT is the only entity in Australia providing such services.

Further detail on AUSSAT's charter, ownership and operations is provided at Attachment A.

Cost Pressures

As a commercially accountable organization, AUSSAT consistently seeks to reduce costs and hence prices to its customers. Cost reduction is particularly important to AUSSAT for two reasons:-

- its major customer base (some 65% of annual revenue) is

  in the Australian television and radio industry, which uses satellite capacity to distribute signals; because of Australia's small population (some 16 million people) by comparison with the USA, the cost of transmission of signals represents a much higher percentage of advertising revenue for Australian broadcasters than would be the case for their U.S. counterparts.

- unit costs of transmission via competitive terrestrial systems continue to decline, particularly with the introduction of fibre optic cables by AUSSAT's competitors.

Current Satellite Procurement

Two of AUSSAT's three operating satellites are due for retirement in December 1992 and June 1993, the dates by which station keeping fuel is expected to be exhausted. Continuity of service beyond those dates is of fundamental importance to AUSSAT's business, and to the business of its customers, who have demonstrated their reliance on AUSSAT by investing some US$200 million in earth stations to access the system. Unlike U.S. satellite operators, AUSSAT does not have access to other satellite systems which could support AUSSAT during the transition to its replacement system.

In calling tenders for two replacement satellites, AUSSAT developed a procurement process which was designed to:-

- provide certainty regarding total cost;
- establish a competitive process for all elements of procurement, including the launch phase and the risks associated with it.

To this end, AUSSAT required tenderers to undertake:-

- to design and construct the satellites;

- to deliver the satellites in orbit by the dates set down above;
- to develop arrangements which would provide a high degree of certainty of continuity of service at the end-of-life of the existing system, even in the face of launch failures and launch delays.

One result of the competitive process established by AUSSAT was the requirement for tenderers to offer launch arrangements as well as satellite construction.

Background to the above requirement was AUSSAT's experience in establishing its initial system of three satellites, which was characterised by rising costs for launch insurance due to a number of launch failures in the period 1984-1987, and to delays in the launch of AUSSAT's satellites as a result of those failures.

AUSSAT received four tenders for its second generation system, three from U.S. suppliers (Hughes Aircraft Company, Ford Aerospace and GE Astrospace) and one from a European consortium (British Aerospace/Matra). Of particular interest was the very competitive offer by the European consortium; clearly the European satellite industry had made considerable progress during the period since AUSSAT called tenders for its first generation satellites in 1980.

Launch Vehicles Offered

During 1987, the China Great Wall Industry Corporation (CGWIC) publicly announced its interest in establishing its Long March series of rockets in the world market, recognising the difficulties being experienced at the time by both the US and European launch industries. CGWIC made it clear that low introductory prices would be offered for the early Long March launches and AUSSAT encouraged prospective tenderers to consider the Long March rocket as one of the alternatives which they might offer.

The prospect of low cost introductory pricing was not new in the world launch industry. For example:-

- when the Space Shuttle was first introduced, the pricing was deliberately held low for the first three years of operation, and subsequently doubled; AUSSAT was able to take advantage of this early low pricing for its first two launches;

- the price of launch on the first Ariane 4 rocket, only a few months ago, was very much lower than will be the price for future Ariane 4 launches.

Each tenderer offered more than one launch vehicle, collectively including the U.S. Titan and Atlas Centaur rocket, the European Ariane and the Chinese Long March. All four offered the Long March. The CGWIC introductory pricing was reflected in all four bids, with a prospective cost reduction to AUSSAT of US$60 million (i.e. 20% of the system cost) for two Long March launches compared to two Western launches.

Hughes was selected for contract negotiations, with the approval of the Australian Government, and AUSSAT entered into a Letter of Intent with Hughes on June 28, 1988 followed by a formal contract on August 28, 1988. In the Letter of Intent, AUSSAT directed Hughes to "make best efforts to achieve all necessary approvals" and to "enter into a Launch Services Agreement for the provision of a Long March launch".

AUSSAT's contract with Hughes is structured so that the price benefit from use of the Long March rocket flows to AUSSAT, not Hughes. Of course, associated risks also flow to AUSSAT; should there be one or more Long March launch failure during AUSSAT launch attempts, the contract defines an associated increase in the costs to be borne by AUSSAT.

Conclusion

AUSSAT's assessment was, and continues to be, that:-

- the price offered for use of the Long March was commercial and competitive in nature, typical of a new product seeking to establish itself in the marketplace, and consistent with previous practice in the industry; such an approach could not be classified as predatory pricing, particularly having in mind CGWIC's stated intention of increasing the price after the first few launches. To some extent, the low introductory pricing reflects the risk attached to use of a newly developed launch vehicle;

- there could be no technology transfer problem because of:-

  - the low level of data required to be provided to CGWIC to enable mating of the satellite to the launch vehicle;

  - the ease with which the satellite supplier could provide physical security for the satellite in China during launch preparation.

This latter view was supported, it seemed, by an advisory opinion by the Department of State to Hughes on December 7, 1987, that "the Department has concluded it anticipates no problem authorising HAC or any other U.S. firm to procure such launch services from China".

Accordingly, AUSSAT can see no basis on which the U.S. Government should decide not to issue the export licence required to permit launch of AUSSAT's next generation satellites on the China Long March rocket.

ATTACHMENT A

AUSSAT PTY. LTD.

AUSSAT Pty. Ltd. ("AUSSAT") is a company established under Australian Companies legislation, for the purpose of carrying on a business, in accordance with sound commercial principles, of providing:-

- a telecommunications system for Australia by the use of space satellites;

- space satellite facilities for use in telecommunications systems for neighboring regions.

The company was incorporated in 1981, and is owned 75% by the Commonwealth of Australia and 25% by the Australian Telecommunications Commission ("Telecom").

In broad terms Australian telecommunications services are provided under the following regime:-

- Telecom has a monopoly on the provision of the terrestrial switched network and of public switched services, for domestic traffic;

- The Overseas Telecommunications Commission (OTC) has a monopoly on the provision of Australia's telecommunications switched network and of public switched telecommunications services, for international traffic;

- AUSSAT has a monopoly on the provision of satellite facilities for domestic telecommunications traffic, and may compete with Telecom in the provision of private network services domestically, and with OTC in the provision of private network services in the South

Pacific area, primarily between Australia and New Zealand.

- Both Telecom and OTC are statutory corporations, 100% owned by the Commonwealth of Australia.

Currently, AUSSAT's network consists of three operating satellites (built by Hughes, two launched by the US Space Shuttle in 1985 and the third launched by the European Ariane rocket in 1987) and a network of some 60 earth stations. A further 15,000 customer-owned earth stations operate through the AUSSAT system in Australia. Telecommunications services are provided by AUSSAT to the broadcasting, aviation, finance, mining, press and other industries. Such industries typically rely on the ability of satellite telecommunications to provide networking and remote area applications more economically than terrestrial systems.

Some capacity on the system has been leased to the Telecommunications Corporation of New Zealand, primarily for the carriage of domestic New Zealand telecommunications traffic.

Continuity of service following the retirement of AUSSAT's first two satellites is of great importance to AUSSAT and to its customers.

The CHAIRMAN. I thank you for your testimony, Mr. Johnson. Let me ask you two questions if I may.

One, in the AUSSAT's—the two satellites that we are talking about now, you mentioned that they would be servicing the Australian television industry, telecommunications industry. Do you serve any other countries besides Australia from those satellites?

Mr. JOHNSON. Yes, Mr. Chairman. They will also have the capacity on board able to serve New Zealand and particularly the New Zealand telecommunications industry.

The CHAIRMAN. Let me ask you the premier question. If the United States Congress decided to in their wisdom or good judgment oppose the issuance of these licenses, so to speak, or these export licenses, and therefore from our point of view did not allow the Hughes Corporation to launch with the Long March rocket, what would Australia do?

Would Australia re-bid that or would you—and this is a tough one—or maybe it isn't—or would you simply say, well, we'll go to the next bidder or we'll go on the open market? And is there any guarantee, for example, that a United States corporation would become favorably considered for the launching of the satellite or would you look to Europe? What would you do?

Mr. JOHNSON. Let me support the view, Mr. Chairman, that it is a tough one, and let me see what I can do with it.

I believe we would have no choice but to re-evaluate the contract award. As to mechanics, I don't quite know how we'd go about that but let me just provide some background.

We made a decision at AUSSAT on this topic in April this year, a decision needed to go from us past the government before we could implement it and that led us into a letter of intent with Hughes at the end of June.

The decision that was made by AUSSAT was made on the basis of the available information at the time and it was made on the basis of providing for us the best possible answer we could achieve and that typically translates to the lowest cost solution.

We made that decision on the presumption that the Long March launch was possible on the basis of the information we had available at the time. If indeed that proves not to be the case, then I believe we would have no choice but to seek to re-optimize the decision and that would mean that we would need to revisit the contract award process. That would open the situation up I believe in a way which would let us consider the European tenderer, would let us reconsider the use of Ariane rather than Long March and indeed it seems to me on my knowledge if we were to select the European tenderer it would still keep open the prospect we could go to Long March.

I think what I can say with certainty is that it would not be proper to presume that we would simply take a decision to stay with Hughes and direct them to use the U.S. launch rocket.

The CHAIRMAN. And you made a very telling point. The discussion—unfortunately there should be more members here—the discussion centered this morning, and I know you were listening to it, about the relationships economically with China and really what we're saying here in relationships with your great country.

Australia will already have committed a half a billion dollars in trade in this area alone between your country and our country and I think it is very important to get on the record, I think you've clarified it, that there's certainly no guarantee if the Congress were to move to veto, if you like, or not allow the Long March to be used, that that business would stay with the United States.

Is that a fair commentary?

Mr. JOHNSON. That is correct.

The CHAIRMAN. The gentleman from New Mexico, Mr. Lujan.

Mr. LUJAN. Thank you very much. Just one quick question. When the requests went out to the various companies to build a satellite for you, was there the insistence by AUSSAT that it be launched on Long March or was that left open to look at all possibilities?

Mr. JOHNSON. It was left open. The proposition we developed was that we sought a contract in which there was a single prime contractor whose responsibility would be to deliver satellites in orbit and that was a fairly new approach in fact. In our understanding that hadn't been done before as a mechanism and the reason we went through that process was that we had suffered badly in getting our first generation launched because of the failure that happened in the launch area during that period and the way in which launch insurance premiums in fact had grown heavily over about three years.

So we concluded we wanted in fact a contract where the prime contractor delivered satellites in orbit. We certainly didn't specify what launch vehicles should be offered and left it totally open and indeed I believe all of the four tenderers offered us more than one launch vehicle from which to choose with of course a range of prices associated with those launch vehicles.

Mr. LUJAN. Was there a great difference in price, the Long March to the other rockets?

Mr. JOHNSON. Yes. From our point of view a decision to go with Long March for both launches will save us around $80 million and that is about 20 percent of the program price. It is a very large number from our point of view.

Mr. LUJAN. Thank you very much. Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman from New Mexico.

Do you feel—do you have any thought in the direction that if you were going to have a little bit of an economic advantage, the $80 million, if you re-bid that, that could change, could it not? It could also be detrimental as far as Australia is concerned if you didn't have that same—if you re-bid it it's a possibility it could come in higher than the deal you have right now, isn't it?

Mr. JOHNSON. Oh, yes indeed.

The CHAIRMAN. Let me ask you one other question. I want to just get this on the record. Did you give any consideration to using the Soviet Proton rocket at all?

Mr. JOHNSON. Mr. Chairman, we thought about that pretty heavily during the period we were specifying the system and writing the tender documents. We believed at that stage there may be a possibility that U.S. policy might permit that process. We got to recognize in fact prior to calling tenders that that wasn't a possibility, that in fact there was a quite clear U.S. Government policy and

I believe a European government policy as well which would not permit the launch of satellites built in the Western world on Proton launches and we therefore didn't expect to receive any tenders which were based on Proton and we didn't receive any tenders based on Proton.

The CHAIRMAN. Were not all the tenders you received all based on Long March?

Mr. JOHNSON. They were.

The CHAIRMAN. So all of the companies that bid as far as the satellites were concerned, including United States companies, were all bid with the Long March rocket involved?

Mr. JOHNSON. That's correct.

The CHAIRMAN. Let me ask you one other question for the record if I may. From your own feeling, from your own experience, what indications do you have about China's long term pricing policies and do you believe that the current rates of the AUSSAT launch represents special introductory rates? I believe you spoke to that. What is your feeling on that?

Mr. JOHNSON. Yes, we have a quite clear view that China is going through a promotional pricing process. I believe it is clear they are offering these low prices for a maximum of three launches and that from there they will seek to move to prices which are clearly not introductory but are sensible from their point of view. I don't quite know what sensible turns out to mean but my impression is that the sorts of conditions that are being discussed here today will be readily negotiable with the Chinese.

The CHAIRMAN. I was following Mr. Mineta's line of questioning earlier and he spoke about in effect hard currency as far as the Chinese are concerned. I fail to understand that because it seems to me that if the Chinese develop more hard currency, which they are doing, it means they are going to become a better customer of somebody's. Isn't that reasonable?

Mr. JOHNSON. Yes, I believe it is.

The CHAIRMAN. Are there any further questions of our distinguished witness?

The gentleman from New Mexico?

Mr. LUJAN. How does retrieval figure in this? Who are the ones that have the retrieval capability? Is that taken into consideration or do you think, well, whenever we have to retrieve one, we can go to the United States and see if we can get it done there?

Mr. JOHNSON. If I understand the question properly, you are asking whether there is a capability to retrieve the satellite from orbit.

Mr. LUJAN. We have it, certainly.

Mr. JOHNSON. Yes, you have but in fact the satellites you have retrieved were retrieved from a wrong orbit. They were retrieved from a low orbit after they had left the Shuttle something like 200 miles up.

Once a geostation satellite is in its proper orbit it is about 22,000 miles up and there's currently no capability anywhere to retrieve those satellites.

Mr. LUJAN. Do these satellites go into geo?

Mr. JOHNSON. Yes. Geostationary orbit, so that's 22,000 miles up over the Equator.

Mr. LUJAN. Well, some day we will.

Mr. JOHNSON. Maybe some day, yes.

The CHAIRMAN. If the gentleman would clarify one more point. Apparently the staff thinks we didn't ask the question properly.

In the area, when I asked you, that everybody quoted using the Long March, did you ask for options—they could either go with the Long March and/or the Ariane, and/or—did you have different options on it or did everybody just bid with the Long March?

Mr. JOHNSON. In the original tender documentation we left it open totally as to what might be bid. In the process then of clarifying and elaborating those tenders we sought to put the tenderers on all fours by insuring that they bid Long March and in fact at the end of that process they all bid Long March one way or the other. In the formal tendering process we received bids from all tenderers for Long March.

The CHAIRMAN. Did they all bid Ariane and did they all bid U.S. rockets?

Mr. JOHNSON. No.

The CHAIRMAN. They did not.

Mr. LUJAN. If the gentleman would yield, the $80 million was for two satellites, for both satellites?

Mr. JOHNSON. Yes, if we succeed in having two Long March launches it will save us $80 million.

The CHAIRMAN. If there are no further questions, I would like to thank you very much for coming, and we appreciate your assistance. I have visited in your great country, particularly down in Sydney, and I would like to be going back with you. It is probably going to be nicer there for the next couple of months.

Thanks very much for your help. We appreciate it a great deal.

Mr. JOHNSON. Thank you, Mr. Chairman.

The CHAIRMAN. The next witness we have would be Mr. Alan Cooper, who is the Divisional Manager, Satellite Policy, Cable and Wireless, from London, England. We want to welcome you, Mr. Cooper. Would you identify your colleague for the record for us, please?

Mr. COOPER. Thank you, Mr. Chairman.

Mr. Steven Levy is our lawyer.

The CHAIRMAN. We want to welcome you. We are looking forward to your testimony, and we appreciate your being with us today.

STATEMENT OF MR. ALAN COOPER, DIVISIONAL MANAGER, SATELLITE POLICY, CABLE AND WIRELESS, PLC, LONDON, ENGLAND, ACCOMPANIED BY STEVEN A. LEVY, ESQ., COUNSEL.

Mr. COOPER. Thank you, Mr. Chairman and members of the committee.

I am Alan Cooper, Divisional Manager of the Satellite Policy Group of my company, Cable and Wireless ("C & W") which is based in the United Kingdom. Thank you for affording me the opportunity to come before the committee today and testify on behalf of Asia Satellite Telecommunications, Ltd., briefly known as AsiaSat.

I am to discuss our particular interest in the Chinese Long March launch to launch the American-made WESTAR VI domestic satellite. My company, Cable & Wireless, is a partner in AsiaSat. This arises from our activities on a world-wide basis in telecommunications throughout the world.

We approach the export control issues involved in our application as commercial people with commercial challenges to meet. In this respect, the use of the Long March is not an end in itself but a means to a very ambitious objective. Our goal is to establish a satellite system to meet the very real domestic service needs of several Asian countries.

Achieving our objective means that we will be able to unite through the common use of the satellite a group of Asian countries whose importance to the West, I believe, is self- evident. They include Hong Kong, Pakistan, Thailand and the People's Republic of China.

In order to be successful, we need to be up and running by mid-1990 or the market will be at risk to others, particularly the Soviet Union and possibly the Japanese, who we have identified as expressing considerable interest in this market.

We cannot succeed without significant international cooperation and the support of China. Our partners in the AsiaSat consortium include Hutchison Whampoa Limited, one of the leading Hong Kong investment houses, and China International Trust and Investment Corporation, briefly called CITIC, the capitalist trading arm of the People's Republic of China.

In addition to their key role as a one-third owner and investor, China will be a major user of this satellite. Tying China into it is especially important because the satellite project has grown out of our immediate need to meet the increased communications between our operations in Hong Kong and the remote areas of the People's Republic of China. That is a very difficult economic communication problem, and the satellite would solve it.

Against this background, Long March fits the need of our venture perfectly. Unless we are operational by early 1990, the advantage of purchasing WESTAR VI virtually disappears, and we do not believe it would be feasible to secure that market.

For the record, no other launch vendor could commit to our time scale. Second, the use of Long March will provide the Chinese a hard currency inflow that will enable the various users and CITIC to justify the outflows required for the use of the satellite and for CITIC's share of the necessary investment. There is a bill to pay to Hughes of some considerable amounts which we haven't yet agreed.

It is undeniable that Long March enjoys a price advantage, but we believe the pricing issues are overemphasized in relation to other commercial considerations. We are talking to Long March in the order of $13 million for a launch of this satellite. Compared with Ariane's recent offer to launch PanAmSat for $8 million, this does not appear to be a terribly promotional cost.

In addition, because of the technical differences, the additional insurance and the cost of U.S. personnel to oversee the management of the launch and the security thereof, it increases the cost to us quite considerably, and we pay a penalty in terms of technical performance where we lose some six to nine months on the satellite's life. That could amount to something in the order of $15 million.

This penalty, we believe, effectively erases the price advantage of Long March, particularly as compared to the possibility of a shared Ariane launch at $42 million. Using Long March also entails the cost of the technology security plan, which I just mentioned.

First let me emphasize that as a resident U.K. company, we do not wish to be party to any project that would compromise Western technology. We have developed a high degree of confidence in the technology control plan developed with Hughes that will meet the requirements of the Arms Export Control Act. Our own government, we adhere to their obligations to COCOM.

It is fair to state that the Chinese will have no contact with the satellite in providing the physical labor to unload the containers and hoist the satellite onto the rocket. We take the administration's decision as giving tacit approval to our plan. In this regard we believe the administration struck the appropriate balance by not allowing the concerns over technology transfer to be used as a pretext for market protection.

I must emphasize, Mr. Chairman, that our perception of a Long March launch is timing. That is the essence. We believe that if we cannot get a Long March launch, they were the only ones that could offer us the date that gave us the advantage, and we lose the market.

Thank you.

[The prepared statement of Mr. Cooper follows:]

TESTIMONY

OF

ALAN L. COOPER
GENERAL MANAGER, SATELLITE POLICY
AND PLANNING
CABLE & WIRELESS, PLC

BEFORE
THE HOUSE COMMITTEE
ON
SCIENCE, SPACE AND TECHNOLOGY

September 23, 1988

Mr. Chairman and Members of the Committee:

Thank you for extending me this opportunity to testify before you today in connection with the Administration's conditional approval of the launch of U.S. satellites by means of the Chinese Long March vehicle. My company, Cable & Wireless, PLC ("C&W") is headquartered in the United Kingdom and is one-third owner of Asia Satellite Telecommunications Co. (HK) LTD, known as AsiaSat. AsiaSat has filed an application to authorize the shipment of the former WESTAR VI satellite to China for launch on a Long March III launcher in the late 1989/early 1990 time frame. Our application is one of those which was dealt with specifically by the Administration in its September 9, 1988 policy announcement. My purpose in coming before you today is to explain how AsiaSat arrived at a decision to use Long March and how, from our commercial perspective, we are affected by the conditions expressed in the Administration's decision.

I. AsiaSat and Its Goals

First, by way of background, the AsiaSat consortium is a UK-Hong Kong-PRC joint project. The consortium was organized to unite three of East Asia's largest commercial concerns in a very ambitious undertaking. AsiaSat's objective is to provide communication satellite capacity throughout East Asia. This objective requires tremendous capital support and planning on a multinational level. The individual partners of the consortium are well suited to that purpose.

The three partners in the consortium are:

- Cable & Wireless, PLC. C&W is a worldwide telecommunications organization providing communications services to many countries around the world. We are an old company, having served, in effect, as the communication arm of the British Empire and, later, the Commonwealth, by providing essential communication links to unite British interest around the world. Our gross revenue in 1988 was nearly $1.8 billion on a net asset base that exceeds $2.1 billion.

  Our communications network operations are spread throughout the world, with significant activity in the Gulf, the Caribbean, within the UK, and in the Far East, most notably Hong Kong and Macau. We also serve on the Board of Governors of INTELSAT and account for one-third of the UK ownership and use of the global satellite system.

- Hutchison Telecommunications Limited. Hutchison is a major trade and investment house based in Hong Kong. Its parent company Hutchison Whampoa Limited is, in the parlance of the novelist James Clavell, one of Hong Kong's distinguished "Noble Houses" or "Hongs". Hutchison represents a major trading center in the Far East, holding one of Hong Kong's largest and most profitable and diversified portfolios, including investments in property and development and management, import and export, retailing, quarrying, telecommunications, container terminal operations, power generation and supply, oil and gas and China trade. Hutchison's 1987 turnover exceeded HK$10.5 billion on capital exceeding HK$22.6 billion.

- CITIC Technology Corporation. CITIC is a wholly-owned subsidiary of China International Trust and Investment Corp. and is engaged mainly in technology related matters. CITIC is essentially the capitalist arm of China and

> oversees the bulk of China's overseas investment activities and is a major source of hard currency to support Chinese trade and development. Its Chairman, Mr. Rong Yiren, was a leading trader in Shanghai prior to the Communist takeover and lived under house arrest until he was restored to prominence as a symbol of the new China by the present government.

In accordance with our goals and the makeup of the consortium, we approach the export license issue and come to this forum as commercial people with commercial purposes and issues to resolve. Our mission is not a launch per se, but to build a communication satellite project of enormous potential, benefit and scope. Long March is simply a means to that end. To achieve our program we need to achieve operational service as quickly as possible. Our commercial requirement for a timely, cost effective launch arrangement which suits our overall service objective makes Long March the optimal choice for our particular requirement. This conclusion was a considered judgment guided by our overall business goals. These purposes include:

- An immediate need for improved links between Hong Kong and the PRC. As China's international trade and commerce increases, there is an increasing commercial intercourse between the interests in PRC and in Hong Kong. These commercial exchanges have given rise to growing, unmet demand for basic communications services linking Hong Kong and remote areas of the PRC.
- The establishment of a base for continued UK involvement in Asian domestic telecommunications, notwithstanding the change of Hong Kong's administrative status in 1997.

- The formation of a community of Asian countries through the shared use of a common, western-controlled space communication system. Through the use of WESTAR VI, the AsiaSat system has higher power and utility over the areas covered by the AsiaSat footprint than any other system presently available in the region, including INTELSAT. Through the synergy of the participants, AsiaSat will be able to provide service to China, including Hong Kong and Macau, and the neighboring Asian countries including Pakistan, Thailand, Burma, Nepal, Bangladesh, and Korea. At present in the near time frame there is no alternative source of domestic satellite capacity for these countries. These countries are of obvious strategic importance for the UK and its allies, including the United States.

- Preemption of other competitive ventures, notably extensions of the Soviet and Japanese domestic systems, which are pursuing the same market. These alternatives will be available in the event that the deployment of AsiaSat is delayed beyond 1990.

AsiaSat intends to inaugurate commercial satellite communication services in the Far East in the early 1990. Its initial facility is the WESTAR VI communication satellite, which was recovered from space in 1984 in a heroic effort by the space shuttle Challenger. Pursuant to the recovery agreement with NASA, an insurance syndicate headed by Merrett underwriters at Lloyds (London, UK) contributed $5 million toward the cost of the mission in exchange for salvage and resale rights to the satellite. AsiaSat has concluded a purchase agreement with the lead UK underwriters and will undertake an extensive modification and refurbishment program with Hughes Aircraft Company, thereby building its business base upon the foundation of the NASA recovery effort and the international support underlying that support under the auspices of Lloyds and the satellite's U.S. manufacturer, Hughes Aircraft.

Thus, the key to AsiaSat's business plan is the ability to begin service promptly. Using the existing WESTAR VI is one key element to accelerate the timing of our service. The availability of Long March is the other key element. In this way, we intend to take advantage of the superior industrial capability of Hughes Aircraft Company and the assured availability of a Long March launch.

II. The Business Case for Long March

A. The Role of China and Other Non-Price Criteria for Selection of Long March.

Our decision to use Long March is mainly out of consideration for the fundamental importance of China to the overall success of the project and the crucial element of timing. China's support is obviously key to the achievement of AsiaSat's commercial objectives. China will be serving in two principal roles, as an investor and as a major user of the system capacity. Through CITIC China will assume one-third of the investment. The cost of the spacecraft alone, including the Hughes work, is $43 million. An additionial $60 million will be required for the necessary launch services, insurance, and TT&C facilities. We expect the last to be purchased from U.S. sources. As a user, China will take up to one-third of the capacity of the satellite for domestic requirements.

Long March will provide the timely availability of needed launch capacity and offers a cost effective launch service. In terms of the direct needs of the venture, the purchase of launch services from Long March will provide a hard currency in-flow that will justify outflows for the Chinese investment in AsiaSat, through CITIC, and the payment to AsiaSat of usage charges for capacity actually subscribed by domestic PRC users.

Long March is also commended by a record of reliability that compares favorably with the Delta and which is surpassed only by the recent string of successes of Ariane. In addition, I can state for the record that no other launch provider, either U.S. or European, could commit to our anticipated early - 1990 requirement with sufficient certainty to enable us to embark on the 18 month refurbishment and launch campaign which is necessary to restore WESTAR VI in anticipation of using any alternative to Long March. Furthermore, given the 18 month lead time required, our commercial objectives will be seriously threatened if we encounter delays in final approval of the license beyond this Autumn.

Thus, there are purposes that commend the selection of Long March, quite irrespective of price. Frankly, too much is made of the pricing aspect. The principal advantages of Long March in the context of this venture are timing, reliability, and availability. These considerations are paramount in any launch procurement decision and historically have favored the use of U.S. launchers.

Our own experience at C&W, where as participants on the INTELSAT Board of Governors, we have approved nearly 40 international launch procurements, is consistent with this perspective. The total dollar value of the launch contracts in which C&W has participated exceeds $1.2 billion, with nearly $1 billion flowing to U.S. sources. There were few, if any, "bargain" launches in the mix. But, we were more interested in performance and reliability than in transitory price advantages. Indeed, Ariane has not cornered the launch market by virtue of its lower price. We would expect that overall the U.S. will continue to dominate the international market.

The AsiaSat venture and its plan to use Long March III is our first encounter with the Chinese launch program. We do not approach such a decision lightly given the enormous consequences of any misstep. Just as we have participated in over $1.2 billion in launch services procurements, so too have we suffered our share of the occasional losses due to launch failures involving INTELSAT spacecraft. Insurance certainly did not repay INTELSAT and will not repay AsiaSat the lost opportunity represented by a catastrophic failure of the launch system, regardless of source. Given the substantial amount that must be paid for insurance to protect against the loss of payload -- a nearly 25% loss premium -- it simply does not make commercial sense to give undue emphasis to price advantage in comparing various launch options.

C. Pricing Aspects

Obviously, pricing is an important advantage with respect to Long March. However, if the issue of pricing is examined in competitive terms, particularly *vis a vis* AsiaSat's theoretical options, the AsiaSat "precedent" should not raise any serious long term concerns.

First, AsiaSat is not benefitting from any "deep" discounts, particularly as contrasted with recent experience with Ariane, which offered a $8 million launch to a U.S. customer, PanAmSat. Whether described as "experimental" or "promotional" pricing, the fact remains that no different than the Ariane IV which figured in the PanAmSat promotion, Long March III has yet to be proven in the world market. However, notwithstanding the lack of a commercial track record, AsiaSat has been quoted by Long March a price of approximately $30 million with a re-launch option, in the event of failure, for an additional $3 million. This price is close to the standard

Ariane shared launch price of $42 million. The re-launch, of course, is of no use if we do not secure a replacement satellite.

It is apparent why PRC price level may trend lower than the western equivalent when one simply looks at the labor differentials. A Long March booster takes approximately 20 months to construct. Such an undertaking must, of necessity, be manpower intensive. With salary differentials perhaps in the order of 100 to 1, if PRC launch prices were, in fact, "cost-based" it would be possible for a profitable offer to be made at levels far below the promotional price which we have been quoted.

Given differences in factor costs, particularly labor, the Chinese quotation of $30 million for a dedicated launch, insofar as it is "promotional," compares favorably with equivalent western launch prices. Ariane, for example, has quoted to us $42 million for a shared launch, but, the inability to pin down the schedule and the fact that as a shared launch we would be at the mercy of the schedule of the companion payload, has made it impossible for us to pursue the European option.

Even at "promotional" price levels the apparent price advantage is offset by a substantial cost penalty involved in utilizing Long March. Because of the far more northerly

Chinese launch site, particularly as contrasted with equatorial location of the European Space Agency facility at Kourou used by Ariane, and the lack of a steerable third stage it is necessary to spend approximately 6 to 9 months supply of satellite station keeping fuel in order for a satellite launched from China to reach the proper geostationary orbit inclination. Six to 9 months revenue at the end satellite life is equivalent to approximately $15 million, even allowing for some transponder failures. In addition, we would expect to pay an additional 3% premium on any launch insurance.

While it may be tempting to compare the Chinese launch offering with western alternatives on the basis of the single dimension of launch price, other factors drive the overall end-user cost to levels that largely offset the bare price advantage. Furthermore, we would anticipate, and the Chinese have so indicated, that Long March will align its prices to reflect market conditions and, by implication, value of service principles. Although we cannot speak for the Chinese on this point, it would be reasonable to expect that if their launch vehicle proves to be reliable, their drive to secure hard currency will tend to move their launch service pricing in an upward direction. This view should be borne out in the upcoming government-to-government negotiatios, which will also address the technology transfer aspects.

III. Technology Controls

On this issue of technology safeguards, the Administration struck the appropriate balance between the requirement to safeguard the technology involved, which incidentally is now some 10 years old, and the need to avoid undue burden on commercial interests. The Administration also avoided allowing the technology control process to be manipulated for the benefit of trade protection arms. From a commercial stand point, we are satisfied with the technology control safeguards that we have proposed and that apparently have been embraced by the Administration as a basis for the upcoming government-to-government negotiations. We would anticipate that on this issue, as well as the pricing matters, the Chinese will be fully responsive.

Quite apart from the requirements of the U.S. Export Control Act, we at Cable & Wireless, as a responsible UK company, are in whole-hearted support of our country's fulfillment of its obligations to COCOM. This support is not simply a matter of public duty. It is we, after all, who must reimburse the launch services supplier and/or the satellite manufacturer who will be supporting the launch campaign, the cost of the extra effort that is necessary to safeguard the technology. We are happy to do so because we have no interest in being party to the dissemination of western technology. As framed thus far, we believe that the conditions involved are appropriate and well conceived both in policy and commercial terms. In essence, our technology control plan would preclude any Chinese access to the satellite, except to those visual aspects that are already in the public domain. As we have expressed in the plan, submitted to the Administration and as the Chinese have confirmed, the only involvement of Chinese personnel will be to operate the crane that will lift the satellite on top of the launch vehicle. To the extent that there is any activity surrounding the preparation of the space craft on-site, all such work and incidental exposure of constituent elements of the satellite will take place in a locked facility to which the Chinese will be denied access. Whenever the satellite is outside the preparation building, it will at all times be sealed, even while it is lifted on top of the launch vehicle and installed in its fairing.

IV. Conclusion.

In short, AsiaSat entered into a well considered commercial decision to rely upon the availability in the near term of a Chinese launch. We believe that this decision was taken responsibly, with all due consideration to matters of public and private concern. As constituents of a U.S. ally, we intend to carry out our responsibilities to ensure that the long term interests at stake are adequately protected. We are grateful for the support that the Administration has given thus far to our efforts to establish an operating communications system that will serve the needs of Asia and which will be friendly to our mutual political and commercial interests in the region, as well.

Thank you for your attention and interest.

The CHAIRMAN. Because of the timing, you are saying.

Mr. COOPER. Absolutely.

The CHAIRMAN. Suppose we suspend at this point. We have to vote and we are on a second call. We will go vote and return immediately because I do have some questions I want to take up with you.

[Recess.]

The CHAIRMAN. The Committee will reconvene. When we left to go vote, Mr. Cooper had just finished his initial presentation. Your statement will appear in full in the record, however. We want to do that because you've got a lot of interesting information.

I think it would be worthwhile just to quote or maybe you want to respond to the—on Page 4 of your testimony where you speak of AsiaSat and you speak of the WESTAR VI and how "its initial facility is the WESTAR VI communication satellite, which was recovered from space in 1984 in a heroic effort by the space shuttle Challenger. Pursuant to the recovery agreement with NASA, an insurance syndicate, headed by Merrett underwriters of Lloyds of London, contributed $5 million toward the cost of the mission in exchange for salvage and resale rights to the satellite. AsiaSat has concluded a purchase agreement...and will undertake an extensive modification and refurbishment program with Hughes Aircraft Company..."

I just want to—that's an important issue because, in effect, people have asked, well, how did you guys get a hold of that particular satellite. But that's the answer to it, right?

Mr. COOPER. Yes, sir. That is correct.

The CHAIRMAN. Okay. The next thing was the—I think it was important. You mentioned that, on Page 7 of your testimony, your own experience as participants on the INTELSAT Board of Governors. You're on the Board of Governors, are you not?

Mr. COOPER. Yes. I'm part of the U.K.

The CHAIRMAN. Representing the U.K.?

Mr. COOPER. No. I don't represent the U.K. I'm part of the U.K. team with British Telecom.

The CHAIRMAN. But then we say that of the nearly 40 international launch procurements, as consistent with this perspective, and the total dollar value of the launch contracts in which C&W has participated, exceeds $1.2 billion with nearly $1 billion flowing into the United States sources. I just want to get that. And you mentioned there were a few bargains.

One final question and then I'll defer to the distinguished gentleman from New Mexico. You touched upon the Soviets and the Japanese. You touched upon timing. And you had mentioned, as I recall your testimony, that by 1990, you had to be on with it because that market opportunity is there now and in order to make that market opportunity at the right time, I assume that's why you probably bought that satellite, or at least supplied that satellite, and then recommission it and be able to get it launched in adequate time provided you can move ahead now.

Mr. COOPER. That's correct, sir.

The CHAIRMAN. That's correct. How strong do you see the Soviets and the Japanese working toward penetrating that communications opportunity the Asiatic area? How big a business do you see that to be?

Mr. Cooper. Very big. There is a desperate need, as you probably are aware, that in countries like Pakistan with terrain which is terribly difficult to service by normal telecommunications means, the domestic satellite systems answers that problem efficiently and cheaply. Our marketing people who have been moving through the area have identified the fact that the Russians have also been doing exactly the same thing.

We feel that we need to get in very early to capture that market in the western environment before anybody else can do so. And the Russians seem to us best placed at this time to do so, followed by the Japanese.

The Chairman. Do you see that to be a real developing economic threat, so to speak?

Mr. Cooper. Yes, indeed, sir.

The Chairman. Let me ask one more question. As a director of the—as a member of the Board of Directors of INTELSAT, what do you see down the line in the future for the Chinese wanting to participate in launching additional INTELSAT satellites?

Mr. Cooper. That is a good question. It's rather difficult to answer, but as I understand the situation now, there will be considerable modifications needed to the launcher and possibly the satellite, the new INTELSAT satellite VII that's being negotiated, which could increase the cost both to the satellite and the launcher. I believe INTELSAT are sending a team to investigate the Chinese capabilities today, as I understand it.

But I think that's a question where there are several problems that need to be resolved both on price and technical ability.

The Chairman. Does INTELSAT go through COCOM in any way?

Mr. Cooper. No, sir. It's an international organization, and largely independent.

The Chairman. Well, what's unique about this, it was very unique, if you can indulge me for a moment. Here we have a United States satellite which has been recaptured, so as to speak, and now we're going to—and it would seem logical that you should be the company rehabilitating it, so as to speak, and the satellite is owned one-third, flat out, by the Peoples Republic of China, I would think. And now we're considering whether or not we should be approving a license to launch that and we are also part owners, as is China, of INTELSAT also.

Mr. Cooper. Correct, sir.

The Chairman. Now, where is there any great transfer of technology involved in that particular issue that would differ, and I suppose I should ask Hughes that, you know?

Mr. Cooper. Sir, I think I can cover it if you like. INTELSAT have completed a contract with Ford Aerospace for the provision of five INTELSAT VII satellites. So as that satellite is manufactured in the United States, I guess they would have to go through this same procedures. It's a United States satellite.

The Chairman. That's interesting. I'll ask Hughes that. The gentleman from New Mexico.

Mr. LUJAN. Thank you very much, Mr. Chairman. I do have a couple of questions. One, of the four that bid, one was British Aerospace and Matra. Had British Aerospace and Matra been the successful one, you'd had to obtain a license from the English Government, I suppose.

Mr. COOPER. Yes, indeed, sir. And abide by the COCOM obligations.

Mr. LUJAN. Do you think there would be the same concerns over there that there are here, or do you think it would have been easier over there?

Mr. COOPER. That's a good question, sir, and I wouldn't like to put my name on the line to that.

Mr. LUJAN. You had reasons other than cost for putting up the satellite, as you say. You want to penetrate that market. You want to get into that market and that was your main consideration and cost was not the primary consideration.

The CHAIRMAN. And timing.

Mr. LUJAN. Yes, and timing. So maybe you could be the one that could tell us a comparison of the cost of the bids. You said—let me lay this groundwork a little bit—the launch is approximately $30 million, the insurance about $7.5. You said the loss of revenue was about $15 million. So that's $52 million. So that's not a cheap launch. The cost of the launch is about—maybe more or less the same. So these other considerations were more important.

Can you give us a comparison of your costs with Hughes and what—

Mr. COOPER. The nearest comparison I can give you is Ariane quoted us $42 million for a launch. That basically equates with the figures you've just given us.

Mr. LUJAN. $10 million off, yeah. What about the others?

Mr. COOPER. We were not able to get a launch slot anywhere near the time we needed to get one.

Mr. LUJAN. Thank you.

The CHAIRMAN. One other question before we conclude. What role, and I'm sure when you—if you're launching this particular satellite we're discussing now, is that to be covered 100 percent by insurance, by the People's Republic of China? Let me—I'm sorry, I'm not phrasing that right. Is this going to be—you own it, so therefore, there's no point in launching it. Do you have some agreement with anybody—no. So you're going to launch what you own so you're not worried about it being launched as—jeez, I'm doing bad on this one.

It's your particular satellite, you're going to launch it with the PRC and so forth and so on. It's not a question of they're just going to launch it and be delivering service to you in space. Do you understand where I'm coming from? As is the case with the Australian situation. Do you know what I mean?

Mr. COOPER. That's correct.

The CHAIRMAN. Now what role do you see the insurance playing?

Mr. COOPER. Well, we will be covering the insurance of transport, etcetera, etcetera.

The CHAIRMAN. What about the launch insurance?

Mr. COOPER. The launch insurance will be negotiated with Long March at approximately three percent of the value with the opportunity for follow-on launch.

The CHAIRMAN. Total cost, would it cover the total replacement cost?

Mr. COOPER. No, no, no. We would have to find another satellite to put on Long March, which is time consuming.

The CHAIRMAN. Time consuming, but see, what people are losing sight of, it isn't just—I don't mean to belabor this. It isn't just the point of view of launching. It's launching successfully so that you don't have a further time delay and you're not losing that service in replacement over a three or four year period of time. Do you understand where I'm coming from?

Mr. COOPER. Sorry. Could you repeat—

The CHAIRMAN. Let's try again. It's not just the point of launching. If I'm going to launch something to get into that window, that opportunity in the market that you spoke about, you have to launch obviously successfully. If you were to have a catastrophic accident and had to replace it, it would take you X number of years and added costs and so forth and so on to be able to replace it. So it's not just the cost of the insurance and the portion that's covered, but also the period of time that you were unable to be in the marketplace. Do you understand? And obviously somebody else could be entering the marketplace at that point. Is that reasonable?

Mr. COOPER. Yes. If I can clarify that point.

The CHAIRMAN. I hope you can do it better than my question.

Mr. COOPER. If we get the export license, we can't move very far until this decision is made one way or the other. If it's in favor, then we immediately go in for a backup satellite to not only replace, but spare that existing satellite. So the time scale wouldn't be that long.

The CHAIRMAN. We want to thank you very much. Your testimony has been very, very helpful to us and we appreciate it a great deal.

Mr. COOPER. Thank you very much.

The CHAIRMAN. Now our next group is the panel of United States Satellite Manufacturers, represented by Dr. John Koehler, Vice President of Space Communications Group, Hughes Aircraft, and Mr. Rex Hollis, President of the Ford Aerospace Satellite Services Corporation in Palo Alto, California.

We have Mr. Koehler and Mr. Hollis. If you want to put your statements in full in the record, that will be achieved in any case. If you want to read your statements, that is fine, or if you want to summarize, that is fine.

Dr. Koehler.

STATEMENTS OF DR. JOHN E. KOEHLER, VICE PRESIDENT, SPACE & COMMUNICATIONS GROUP, HUGHES AIRCRAFT COMPANY; AND MR. REX HOLLIS, PRESIDENT, FORD AEROSPACE SATELLITE SERVICES CORP., FORD AEROSPACE AND COMMUNICATIONS CORP., SPACE SYSTEMS OPERATION.

Mr. KOEHLER. Thank you, Mr. Chairman.

I would like to put my statement in the record and then, in the interest of time, simply offer a summary, passing quickly over points that have already been covered and lingering at perhaps a little greater length on a couple of points that have been less well covered in the discussion so far.

The CHAIRMAN. Without objection, so ordered.

Mr. KOEHLER. I am Vice President of Hughes Aircraft Company, one of the executives responsible for managing the Space and Communications Group of Hughes. We are a builder of commercial communications satellites and Earth stations. We participate in Defense Department programs. We are also the owner of an operating company, Hughes Communications, which operates a fleet of satellites which provide services in the United States to commercial customers and around the world to the United States Navy.

Mr. Chairman, we are very grateful for the role that you have played in drawing together these important hearings. We appreciate the efforts of yourself and your staff, and we welcome very much the opportunity to present our views.

Let me cover three points very briefly. As has been clear from the testimony preceding, the business of communications satellites is very international. Most of the customers are non-U.S. entities, and there is strong competition both from European firms and, emerging very rapidly, from Japanese firms.

Behind them are yet other countries acquiring the capability to build their own spacecraft, including China, India, Brazil, Israel and so on. The commercial communication satellite market, then, is marked principally by international sales and by stiff international competition.

Second point. As a consequence of the launch problems of 1985 and 1986 and the accompanying insurance problems, as Mr. Johnson explained, those who procure satellites now are coming as a matter of course to expect the satellite builders to arrange for launches and insurance. What they are doing fundamentally is trying to share the risk. In the arrangements that they are making, they are seeking contractual structures that will pass some of that risk in some way or other on to the builder of the satellites.

In order to compete in the market, we have to be able to make such arrangements. AUSSAT is one contract of that type. Last year we won a very stiff competition to provide a pair of broadcast satellites to a British company, British Satellite Broadcasting, which also called for delivery in orbit.

In that case it was an entire turnkey system, with Hughes entirely responsible at a fixed price on a fixed timetable, choosing the launch vehicles and delivering in orbit checked out, turned on and warrantied. That kind of arrangement is the way we expect the satellite market to be structured in the future.

Third point. It follows that if that is the market in which we need to compete, U.S. manufacturers will need to have the same access to international launch vehicles that our international competitors have. It would be extremely damaging to the U.S. industry, to the U.S. companies, if it were not possible for us to use the same set of alternative launch vehicles that our competitors in Europe, Japan and in the future elsewhere have access to.

These points really have all been made in earlier testimony.

Let me talk at a little greater length about technology. The law requiring export licenses is aimed at protecting technology. Over the last two months, we have spent an enormous amount of time and effort briefing a large fraction of the population of Washington, D.C. on the technology transfer issues, going through in detail that must have seemed excruciating exactly how the satellites would be managed, where they would be at each stage of the processing, who would be present, what would be visible, what could be seen and what might be relevant.

We believe during that time we clearly demonstrated that no transfer of technology relevant to satellite construction is required in order to successfully launch our satellites on the Chinese launch vehicle. The information that must be exchanged is specified completely in the export license applications and is limited to that which is necessary, basically, to ensure that the rocket and the satellite will be compatible, that where they come together they will fit, and that neither will damage the other.

The basic data are dimensions, stiffness, weights, centers of gravity, electrical requirements and heat tolerance, and they have to be specified. But none of this data will help Chinese build satellites of their own.

Even if the Chinese had free access to the spacecraft, it would teach them little of how it is made. What they would have is basically an aggregation of commercially available parts packaged conveniently in a light weight container, but momentum wheels from Germany, microelectronic circuits from Japan and the United States, traveling wave tubes from our own factories in El Segundo and Torrance and so on.

They won't, of course, have such access. The spacecraft will be under the constant control and surveillance of Hughes employees while being prepared for launch. We have even gone into details working out with the Chinese for example that while the crane operator will have to be Chinese because the controls are in Chinese, and when we lift it out of the box, we don't want a Hughes guy to drop it, but right beside him will be a Hughes person.

As the government witnesses told you this morning, our plan for monitoring and protecting the spacecraft will be reviewed and spot checked by the government, and we welcome that review and spot check.

After the satellite is launched or during the launch process and post-launch, the satellite is essentially inert. It separates from the launch vehicle by a timer. A timer fires the perigee motor. When the satellite is in geostationary transfer orbit, the high elliptical orbit prior to moving to geosynchronous orbit, will be the first time that the satellite is acquired and the telemetry is broadcast. The telemetry and command will be done from Australia, Canada or the United States, not from China.

As the largest satellite builder, we are very reluctant to share any information that might promote the emergence of additional competition. Our interest and those of the United States Government in protecting technology are completely parallel in this case. In fact, there have been cases in the past where we feel we have been a good deal harder-nosed about it than the government.

We welcome the fact that our own technology protection activities will be backstopped by a government-to-government agreement, but actually when the whole process began we thought that the technology transfer issues could be dealt with simply in our own arrangements and in the contracting with the Chinese.

We feel, then, that we successfully demonstrated that technology transfer concerns are unwarranted, so the arguments for denying the license have basically reduced to the additional arguments of economic concerns about the launch vehicle industry and competition it might face.

Let me say that we feel quite strongly that a strong, competitive U.S. launch vehicle industry is important to us. We faced a brief time after the shuttle crash when we were dealing with a non-U.S. monopolist, and it was difficult and awkward. We would not like to repeat that experience. We would be very disturbed if the viability in the long term of the U.S. launch vehicle industry were threatened, but by the same token, a strong, competitive U.S. satellite industry is important, both to the launch vehicle builders and to the country.

Both of the businesses are fundamentally international. Protection by closing the market to potential competitors is a bad way to sustain either of them. Today we may deny the Chinese; in 1993 the Japanese will be in the market; after them, India, Brazil, Mexico. Many countries have the capacity and the intent to build rockets and spacecraft. Choosing to retreat behind trade barriers will ultimately be self-destructive.

Choosing to remain open and competitive by investment in new technology and facilities is very important. Dealing with competitors by being better at meeting customers' needs is constructive and benefits us all.

In conclusion, I would like to urge that the Congress support the license application before you. As you have heard, our customer, AUSSAT, has good commercial reasons to require the lowest cost launches possible. China Great Wall Industries wants to be able to provide those launches. There are, we believe, no issues of technology transfer or other national security concerns that would justify denial.

What U.S. public policy purpose is then served by forcing AUSSAT to pay more than they would otherwise have to for the launches? What would be gained by jeopardizing the U.S. satellite industry and by frustrating Chinese desires to enter a business in which they believe they can compete successfully?

Thank you, Mr. Chairman.

[The prepared statement of John Koehler follows:]

Testimony of

JOHN E. KOEHLER

VICE PRESIDENT, HUGHES AIRCRAFT COMPANY

Before the

HOUSE SCIENCE, SPACE AND TECHNOLOGY COMMITTEE

September 23, 1988

on the

APPLICATION OF HUGHES TO LAUNCH THE AUSSAT B SATELLITES ON THE LONG MARCH ROCKET

Thank you Mr. Chairman.

On behalf of Hughes, I am pleased to be here to support the application transmitted to the Congress by the Department of State. We welcome the opportunity to present our perspective on this important issue.

The line of argument I will present makes just five points:

1. The communications satellite industry is thoroughly international and highly competitive. As foreign manufacturers enter the market this competition will become even more intense.
2. Satellite purchasers now require satellite builders to arrange launches.
3. In order to successfully compete internationally, U.S. satellite manufacturers must therefore have access to the same launch alternatives as our foreign competitors.
4. Arguments to deny the license based on possible technology transfer to China are not persuasive.
5. By contrast, the general policy of promoting competition, as well as permitting countries whose policies are important to us to trade freely, is wise and should be supported in this case.

THE INTERNATIONAL SATELLITE INDUSTRY

Most communications satellites have been bought by companies operating outside the United States. Of the 81 non-Soviet satellites currently in service, 50 belong to international organizations and other non-U.S. companies. In the future, we expect more than two-thirds of satellites sold will be bought by non-U.S. operations.

U.S. companies have been quite successful in this market. Over the last 10 years Hughes alone has sold about $2 billion worth of satellites and related equipment to foreign customers, generating net exports of about $1.5 billion. Ford Aerospace has made major sales abroad. General Electric and TRW have also sold satellites outside the United States.

There is, however, effective and growing competition. European firms now respond to all of the international tenders. Their proposals are serious, their technology up-to-date, and their price competitive. So far, they have not won major open competitions, but in the Aussat B and Intelsat VII cases they were clearly very competitive. To date Japanese companies have provided whole satellites only for their domestic market, participating in the international business as team members and subsystem suppliers. Soon, however, they expect to hold their own against U.S. companies. They have invested in facilities, people, and technology and must be taken seriously.

Thus, the business of supplying communication satellites is one in which foreign markets and foreign competition are critical.

SATELLITES BUNDLED WITH LAUNCH ARRANGEMENTS

In the early days of satellites, customers typically procured launch and insurance services for themselves; the satellite manufacturer was responsible only for the spacecraft and facilities for command and telemetry. Since the launch problems of 1985 and 1986, satellite operators have required manufacturers to accept responsibility for launches and launch insurance arrangements. Some contracts, such as that between Hughes and British Satellite Broadcasting, require delivery on orbit, with the total responsibility for launch and insurance with the manufacturer. Other contracts, like the Aussat arrangements, leave major decisions to the satellite purchaser, but require the manufacturer to act, in effect, as his agent in contracting. We expect that most other operators will require similar support in the future.

IMPACT ON U.S. SPACECRAFT BUILDERS

In order to compete successfully, U.S. satellite builders will have to be able to satisfy their customers' desires for launches at competitive prices. The launch is a major part of the all-up cost of a satellite system -- on the order of one-third or more. Launches plus launch insurance will cost more than the spacecraft. Operator economics, then, are affected in a major way by launch vehicle choices.

If access to launches were limited, such package deals could result in U.S. satellite builders being put at a disadvantage relative to foreign competitors. A European or Japanese competitor able to use Long March at current prices could easily provide an on-orbit system at lower cost than an American company to which the vehicle were denied. The U.S. spacecraft industry, which, unimpeded, is very competitive internationally, could be put at a decisive disadvantage. The impact on the U.S. industry in the long run would be disastrous.

ARGUMENTS FOR DENIAL

The law requiring export licenses is aimed at protecting technology. In the application for the export license and the supporting materials, Hughes clearly demonstrated that no transfer of technology is required in order to successfully launch. The information that must be exchanged is limited to that which is necessary to ensure that the rocket and the satellite will be compatible and neither will damage the other. Dimensions, stiffness, weights, centers of gravity, electrical requirements, and heat tolerance must be specified. None of this data would help the Chinese build satellites of their own.

Even if the Chinese had free access to the spacecraft, it would teach them little of how it is made. But they will not have access. The spacecraft will be under the constant control and surveillance of Hughes employees while being prepared for launch. Telemetry and command for the satellite after launch will be done from Australia, Canada, or the United States. As the largest satellite builder, we are very reluctant to share any information that might promote the emergence of additional competition. So our interests and those of the U.S. Government are completely parallel.

We feel we have successfully demonstrated that technology transfer concerns are unwarranted. The arguments for denying the license have been reduced to economic concerns about the launch vehicle industry and competition it might face. A strong, competitive U.S. rocket industry is important to us. We would be disturbed if its long-term viability were threatened. By the same token, a strong, competitive U.S. satellite industry is important - both to the launch vehicle builders and to the country. Both businesses are international.

Protection by closing the market to potential competitors is a bad way to sustain either one of them. Today we may deny the Chinese. In 1993 the Japanese will be in the market. After them India? Brazil? Mexico? Many countries have the capacity and the intent to build rockets and spacecraft. Choosing to retreat behind trade barriers will ultimately be self-destructive. Choosing to remain open and competitive by investment in new technology and facilities, dealing with competitors by being better at meeting customers' needs is constructive and benefits us all.

CONCLUSION

The license application before you should be approved. As you have heard, our customer, Aussat, has good reasons to require the lowest-cost launches possible. China Great Wall Industries wants to be able to provide those launches. There are no issues of technology transfer or other national security concerns that would justify denial. What U.S. public policy objective is then served by forcing Aussat to pay more than they should have to? What is to be gained by jeopardizing the U.S. satellite industry, and by frustrating Chinese desires to enter a business in which they believe they can compete successfully?

U.S. industry can only survive and prosper in today's economic environment by investing in new technology, by promoting competition, and by striving to excel at meeting customers' needs.

The **Chairman**. We thank you, Dr. Koehler. We have to go vote, if you will pardon us, and we will be back as quickly as possible with Mr. Hollis.

[Recess.]

The **Chairman**. The committee will come to order.

When we broke to vote, we were about ready to hear from Mr. Hollis. Mr. Hollis, go ahead.

Mr. **Hollis**. Mr. Chairman, we appreciate the opportunity to share our views on this important issue.

At Ford Aerospace we manufacture spacecraft, but the demand for our product is heavily influenced by the availability of affordable and reliable launch vehicles on which we all depend.

On a broader plane, we are convinced that the commercial space efforts of the United States are tied directly to a viable launch capability. Launch vehicles are the basic driver to new space-related industries, a multiplier of high technology jobs, and potentially a major factor in international trade. Dependable and affordable transportation for civil space efforts are essential if the United States is to continue as a leader in space activities.

For these reasons, we believe the U.S. commercial launch industry must be considered as a strategic national resource and policies adopted that recognize it as such. Trade agreements must be negotiated that insulate against pricing practices that would preclude the U.S. industry from capturing its fair market share.

In the formation of national policies, however, the international nature of the space industry cannot be ignored or the effect of competition on technical innovation and launch cost. Advancement in these areas will often apply to both commercial and government programs, resulting in manufacturing economies of scale and further cost reductions.

If the Long March vehicle were offered on a basis that did not jeopardize the ability of the U.S. launch industry to survive, we believe those vehicles should be considered as alternate avenues to space, provided, of course, they meet the requirements of the ITAR.

If, however, the United States is unable to negotiate acceptable trade agreements, we urge that a policy be adopted that insulates the U.S. commercial launch industry from predatory or politically influenced pricing practices. The introduction of a foreign government directed entity with radically different bases for pricing could inflict irreparable harm on private U.S. launch vehicle competition.

Thank you, Mr. Chairman. I have submitted written comments.

[The prepared statement of Rex Hollis follows:]

Statement of Rex R. Hollis
Director, Business Development for
Commercial Satellite Programs
Ford Aerospace Corporation
Before the House Science, Space and Technology Committee
September 23, 1988

Ford Aerospace believes that U.S. policy on commercial space launch vehicles must recognize the strategic importance of America's launch vehicle industry.

Ford Aerospace has closely followed and consistently supported efforts by the U.S. Government and aerospace corporations to create a commercial launch capability. We have participated in panel discussions, legislative hearings, and numerous discussions with various government agencies. Our efforts are motivated by a sincere conviction that the future of U.S. commercial space efforts will be heavily influenced by the viability of a domestic commercial launch capability. We cannot afford to depend on other nations for access to space: The U.S. must have its own set of keys.

Moreover, dependable and affordable transportation for today's applications and for new civil space efforts is essential to the nation's future technological and economic development. Myriad additional benefits will accrue to our nation from a healthy commercial launch capability including economies of scale in manufacturing, improved and diversified technology, and alternate capabilities for future government space needs. Without a healthy commercial space launch industry, any future U.S. space capability is predestined to the second cycle. Commercial space activities multiply high technology jobs in the domestic economy and in international trade.

A domestic commercial launch capability, therefore, is of significant strategic value to America's future technological and economic health. We urge that its strategic character be considered in all decisions affecting the industry's viability. A decision on use of the Chinese Long March vehicle for launch of spacecraft manufactured in the United States must be considered of that significance.

Contingent upon passage of legislation similar to that proposed in HR 3765 and S 2395, U.S. launch vehicle manufacturers will compete for launch opportunities on a basis comparable to Europe's Arianespace. Competition of this nature generates innovation and efficiency and benefits U.S. government-sponsored space activities as well as the overall national economy. However, the introduction of a foreign government-directed entity, with a radically different basis for pricing, could inflict irreparable harm on private U.S. launch vehicle competitors.

In many cases, of course, the International Traffic In Arms Regulations (ITAR), will preclude launching U.S.-built satellites on certain foreign launch vehicles. In those cases where technology is not an issue, we urge adoption of a policy regarding launch of U.S.-manufactured spacecraft based on the strategic value of the U.S. launch industry to the nation's total space program. The U.S. launch industry must be free to compete for international launch opportunities in an environment free of predatory or politically influenced pricing practices.

Although the example of launch vehicle pricing, discussed in the foregoing, is the Chinese Long March, the real issue is the impact of arbitrary and disproportionate pricing rather than the country of origin. If the Long March and the Soviet Proton launch vehicles were offered on a basis that did not jeopardize the ability of the U.S. launch industry to survive, we believe those vehicles would logically be included as candidates to provide alternate avenues to space for future launch requirements, provided they met the terms of ITAR. Launch vehicles sales at promotional prices, if limited to initial customers to build Western credibility, need not necessarily be viewed as threatening to U.S. capabilities.

We urge that the U.S. commercial launch industry be recognized as a strategic national resource and policies be adopted and trade agreements negotiated that prevent arbitrary pricing calculated to preclude U.S. industry from capturing its fair market share. We ask that insulation from disruptive pricing practices and the potential impact of these policies on spacecraft suppliers also receive due consideration. (Unilateral action on the part of the U.S. to protect its developing launch industry might place U.S. spacecraft suppliers in an untenable position against foreign suppliers able to offer arbitrarily priced launches.)

We would be pleased to offer our assistance in developing a U.S. policy to ensure a competitive environment for the launch vehicle industry in the nation's best interest.

The **Chairman**. I thank the gentleman for your valid testimony.

Why don't I defer to you, Mr. Lujan, for the moment, while I look this over.

Mr. **Lujan**. Thank you very much, Mr. Chairman.

These three satellites are in a different category, it seems to me, than what we would have to consider in setting a launching policy for the use of foreign launchers. The French, for example, can't launch except on Ariane. We could not launch a French satellite, nor do I believe that we will be able to launch any Chinese satellites in the future.

Would it be wrong—if it is, particularly in your case, Mr. Koehler, you are the one who has been more insistent on that—for us to say that satellites owned by U.S. companies must be launched on U.S. rockets?

Mr. **Koehler**. That would be a substantial deviation from current practice. U.S. satellite owners, including GTE, IBM and several others have launched on Ariane. By the same token, there are some European-built satellites that will launch and have launched on U.S. vehicles.

I would have to supply the details for the record, but I believe a Skynet IV is launching on a Titan next year. There were a couple of European vehicles launched from the Shuttle earlier on. So the markets are not entirely insulated, but there is a strong preference on the part of the Europeans to use Ariane. By contrast, Ariane has been used fairly widely by U.S. satellite operators.

Mr. **Lujan**. That would be interesting if you could give us a breakdown of that.

Mr. **Koehler**. The situation, by the way, is paralleled by the situation in the satellite business. The European satellite builders enjoy a protected market in which we are not welcome. We need not bother sending an offer to Eutelsat when it tendered for new satellites, nor to the French government for Telecom or TDF.

Mr. **Lujan**. And vice-versa?

Mr. **Koehler**. No. Most of the U.S. competitions are by private companies and are open to European competitors, although I can't recall a U.S. entirely domestic company that has gotten a bid from a European company.

Mr. **Lujan**. As you know, and Mr. Hollis has been talking about that, our concern is to develop a domestic launch industry. Do you think we can compete with the Long March, and why?

Mr. **Koehler**. I think in the long run the Chinese will be inclined to charge something like market prices. If they charge prices substantially below market prices, they will be leaving a lot of money on the table every time they make a sale. The question is can U.S. companies compete with an entity that is in a non-market economy? We do do that in other realms, and successfully. The question is how much in the way of real losses—I mean losses are real even in non-market economies—the question is how much in real losses they are willing to absorb to offset inefficiencies, and I think that is bounded in the case of China.

I would be surprised if in the long run, just on a cost-effectiveness basis, the American industry had great difficulty competing with the Chinese.

There is another interest here, by the way, which wouldn't ordinarily be raised. Satellite operators have a strong desire to diversify their launches. The reason is simple. When there is a launch failure, there may be a period of up to years while the launch vehicle builder figures out what happened and fixes it and we proceed to launch again.

Mr. LUJAN. That is what happened to us.

Mr. KOEHLER. Exactly. That is what happened to us. It happened not only on the Shuttle but on the Titan, Atlas, Delta and Ariane. So suppliers who need satellites in orbit have a strong incentive to have a diversified portfolio of launches. For example, we have to deliver in orbit two satellites to our Japanese joint venturer. After the Shuttle crash, and they were manifested on the Shuttle, we had to go seek other opportunities.

At that time the only opportunity was Ariane. We put the first one on Ariane. Later we had to make launch arrangements for the second.

I can tell you that an important consideration in our selection of Titan for the second satellite was that we did not want to be vulnerable to an outage that took Ariane down for a prolonged period. All of us in this kind of business have to make judgments like that. So just on diversification grounds alone.

Mr. LUJAN. Did you pay more.

Mr. KOEHLER. I believe we paid more for that option, yes, although the prices tended to be very close. It is a competitive market.

Mr. LUJAN. Thank you very much, Mr. Chairman.

The CHAIRMAN. The gentleman from Missouri, Mr. Volkmer.

Mr. VOLKMER. I would to just maybe go a little bit longer on the fact that the Ariane has been carrying not only American-made satellites owned by foreigners but American-made satellites owned by American companies. What is interesting to me is there has been no hue and cry about those and what that is doing to our ELV market, whatever it is doing, from the members of the Congress that are so concerned now about the Chinese.

I think we have got to face that this is an international competition.

I would like to ask you, at the time that the contracts were made with AUSSAT and with the Consortium, AsiaSat, you are obligated to seek the launch as well as build the satellite; is that correct?

Mr. KOEHLER. That is correct.

Mr. VOLKMER. Did you go into a bidding process at that time?

Mr. KOEHLER. With the launch vehicle manufacturers?

Mr. VOLKMER. Yes.

Mr. KOEHLER. We had received bids prior so that we could incorporate expected prices for Long March and for Western alternatives in our package price that we sent forward to AUSSAT. So what we presented to AUSSAT was—

Mr. VOLKMER. You had already done the bidding.

Mr. KOEHLER. Oh, yes. We did not have and still don't have firm contractual relationships, so we are taking some risk that we have guessed wrong at the price at which we will be able to procure either a Western launch vehicle or a Long March. But we were able to bound that uncertainty and we are now getting final offers from the various manufacturers.

Mr. VOLKMER. Is it true, as the State Department testified, that if your understanding that the Chinese Long March is not the launch vehicle for the AsiaSat, that you probably wouldn't be rehabbing that satellite?

Mr. KOEHLER. I think that is likely. As the testimony presented, timing is apparently important to AsiaSat's business plan. I think there is an additional consideration that since the Chinese are major investors in AsiaSat, that they might be less interested in investing were a Western launch vehicle used.

I am not certain. I am really not the right person to answer that question.

Mr. VOLKMER. To go back on the bidding, and I am not asking for figures and I wouldn't want to do that, was Ariane next in line?

Mr. KOEHLER. As I said, we are just now getting final offers, so it is not clear who will wind up with the most attractive Western launch offer. My recollection is that the spread among the Western alternatives was narrow.

Mr. VOLKMER. Very narrow. All right.

There is no question that the Japanese are gearing up in the early nineties that they are going to be in this market also as far as launch vehicles; is that correct? Do you see it that way?

Mr. KOEHLER. That is absolutely correct. They intend to fly, I believe—the H-II will be their first really competitive capable launch vehicle. They intend to fly that for the first time, I believe now, in 1992. Following the Shuttle crash, about four or five months following the Shuttle crash, Japanese representatives began to appear in my office indicating their desire to make arrangements to sell H-II to commercial operators.

At the same time NASDA, the Japanese space development agency, began showing us plans for a shroud, a fairing, that would be large enough to accommodate our next generation satellites. So I believe their policy changed in that period from one in which they said, at least as declaratory policy, that H-II was for domestic Japanese use to one in which they began to contemplate serious export.

Mr. VOLKMER. When they reach that capability, do you anticipate that on their first launches that they would discount their price in order to get into the market?

Mr. KOEHLER. It would be purely speculative, but it would not be a surprise.

Mr. VOLKMER. Hasn't this been basically the trend, though? When Ariane first went, they were heavily subsidized, very low.

Mr. KOEHLER. That is correct. I would not be surprised if that were offered. In part, introductory deals are required because work is required on the part of the satellite manufacturer to adapt his spacecraft to a new family of launch vehicles, so there is a cost rationale for it in addition to acquiring credibility in the market. I would not be surprised if the Japanese would.

Mr. VOLKMER. I am sorry I wasn't here to hear your testimony. I was chairing the House during your testimony, but I reviewed it. It appears that you are satisfied, that Hughes is satisfied that there would not be any technology transfer during the period of the satellite being in China and the systems integration with the satellite with the launch vehicle.

Mr. KOEHLER. Yes, sir, and that is for two reasons. It is not of concern to us for two reasons. One, the information that has to be transferred is minimal. Second, the satellite will remain under our protection all of the time. Third, even if the satellite were to be available for their close inspection over a prolonged period, our belief is that it would teach them little about how one would create such a device.

Communications satellites, you must remember, are built by us on fixed price contracts to firm schedules. We don't do development on fixed price, firm schedule commercial satellite contracts. So what is embodied is typically not the cutting edge of the state of the art like we might do in spacecraft we build for NASA or the Defense Department.

So I think if they opened it up and poked around inside, what they would find would not be terribly exciting, especially since they have large numbers of engineers in school at Stanford and MIT already.

Mr. VOLKMER. Thank you.

The CHAIRMAN. You used the word in your dissertation of affordable and dependable, is the word you used, and you both testified to the point of view that we need a strong, robust, domestic—what do you call it, launch capability. This committee agrees with you, that's one thing we don't argue on, and this committee has been leading the battle, as you know, for the last two years, to assure that this nation has that dual capability, for obvious reasons, without going into the whole ball of wax.

So it's very important to us in this overall review, to recognize that as one of our goals. Whether or not the launching of two Long March is going to solve that problem, frankly, in my judgment, it is not. But I think it gives us a chance to air this whole issue.

Now one point that we have just talked about is that we don't launch any commercial satellites, practically. There's none, I don't think, in this country; they are all just looking over the list, they are the government of India's McDonnell Douglas, what is this one here now, British's McDonnell Douglas, Marietta is, Japanese Marietta, British, so forth and so on.

But they launch ours, they launch our commercial satellites. Now we have got to figure that out, why. In other words, I don't think the pricing is—the price of the launch that they apply, namely the Chinese at this point, is the total answer at all. I just don't think that that's even relevant.

If we are talking about dependability, we want to be in a position not only to be dependable, but how do we get the insurance coverages? Isn't that an important point to you?

Mr. KOEHLER. Absolutely. Insurance coverage is terribly important.

The CHAIRMAN. Okay.

Mr. KOEHLER. In fact, let me give you—

The CHAIRMAN. What proportionate share, if you're putting this puzzle together, what proportionate share does that play?

Mr. KOEHLER. Well, it's difficult to quantify it exactly, but let me give you an example. In 1985, in '84, Hughes Communications, our satellite operating company, had to launch the first two of our galaxy satellites, C-Band satellites that provide commercial service in the U.S. Schedule was terribly important to our business plan, because we were obligated to begin providing service to our customers, HBO, CNN, C-Span, and so on.

We faced at that point a choice between shuttle launches, which then I guess for that class of spacecraft would have been—with an all—would have been on the order of $10 million, or a Delta launch, which at that point NASA was pricing at over $30 million. We went Delta, because—

The CHAIRMAN. Because of scheduling?

Mr. KOEHLER. We—we could schedule nominally on the shuttle at the right time, but schedule confidence was critical.

The CHAIRMAN. Well, let's deal with the shuttle—the scheduling, because you've made that point two or three times. In other words, I'm trying to figure out in my mind—I know all the other members are going to do the same thing—why is it, and what should we be doing to stimulate our private carriers, so to speak, and make them competitive?

Now but scheduling—it's not just the cost of insurance now—scheduling is important. What does that mean?

Mr. KOEHLER. Well, it means that we typically have a business plan which involves investing two or three hundred million dollars in a stream as we pay for the satellite. The interest on that every year is a lot. If you are delayed unexpectedly, the carrying charges on the debt can be an enormous blow to a business plan.

In addition, in the case of carriers such as ourselves and AUSSAT, where you are already in business, not starting a new business, but already providing service, continuity of service to your customers is critical. AUSSAT bears an even greater burden than the U.S. operator, because there is no alternative in Australia.

So we are willing to, in the case of AUSSAT, a carrier is willing to launch satellites, I would judge, several months earlier than nominal need date, because life of a satellite is a probabilistic variable, and in order to have sufficient confidence of continuity, they accept that dead weight loss.

We will do the same thing when we replace our Galaxy satellites, which also must provide continuous service to our customers.

The revenue stream from the spacecraft may be as much as 50 percent, say, per year, 50 percent of the cost of putting the capital in place. So if you interrupt that or delay it, the impact on your business is very serious.

The CHAIRMAN. Well, why do we have problems with scheduling in the United States? I'm not being facetious.

Mr. KOEHLER. Well, we had problems, of course, when Shuttle was coming on line because of delays. We have had problems, of course, following Shuttle crash with rescheduling.

The CHAIRMAN. I see.

Mr. KOEHLER. And—

The CHAIRMAN. But as we look to the commercial part of the industry now?

Mr. KOEHLER. As we look now toward the future, I think operators now have before them a set of alternatives which will make it possible for us to protect ourselves better against this kind of scheduling uncertainty, in the way that we did with our Japanese satellites, hedging against an Ariane failure, hedging against a Titan failure.

The CHAIRMAN. Well, interestingly enough, I just noticed here the committee addressed the scheduling issue in H.R. 4399, prohibiting government preemption of commercial launches in cases of impaired—other than as part of national—

Mr. KOEHLER. Yes.

The CHAIRMAN. Go back to insurance.

Mr. KOEHLER. Just a second. We appreciated that very much. That was a terribly difficult problem for us to negotiate when we did the agreement with Martin-Marietta. Arianespace was not similarly disadvantaged, and we were concerned—you know, obviously security must take priority, but you would like that decision to be made in a serious way by senior officials, not far down the chain of command.

The CHAIRMAN. Go back to insurance. In other words, we—it is the opinion of the committee that the—it was mentioned that bill came out here unanimously, wasn't it, the insurance issue? And obviously the committee considered that to be an extraordinarily important issue, because we think that without the adequate insurance coverage, that we don't see how our people can compete at all.

Now apparently without rehashing the whole thing—you heard this morning when Mr. Nelson brought up the point of a potential veto and so forth and so on. Well, if we're going to be boosting the capability of our own commercial system, then we've got to be able to compete and certainly there's a level playing field, there should be in the insurance area. Wouldn't you agree with that?

Mr. KOEHLER. Mr. Chairman, we strongly support that. The Hughes Aircraft Company has taken a strong position in support of that bill, and you are exactly right. It seems to me to be a proper function of the government to eliminate the effect of asymmetries in issues like liability law that would disadvantage a U.S. company relative to a foreign company, and we were keenly aware of the problem that our colleagues in the launch vehicle industry were facing. For example, when we were negotiating contracts with U.S. launchers following the shuttle crash, exactly how that liability would be divided between them and us was a terribly important issue, and there was no way I could, in good conscience, go to my board of directors and say you ought to bet General Motors on this Titan launch.

In the event then the risk was mostly taken by the launch vehicle suppliers, and your bill, the Congressional bill, will offset that disadvantage.

The CHAIRMAN. Where I'm coming from, if you were going to enter into an agreement with XYZ at this point, and you decided that—and you were going to particularly put this satellite into orbit, that was part of your contract vis-a-vis similar to the Australian situation, how can a United States company compete—forget the cost of the launch per se, and the insurance end of it—if the Chinese government says to you, well, we will give you 100 percent coverage, we're going to give you 100 percent coverage, that's part of the bill, the Long March? We in the United States can't do that.

Mr. **Koehler**. Well, we need to distinguish between the liability insurance and the insurance on the spacecraft.

The **Chairman**. Well, I'm talking about the spacecraft now.

Mr. **Koehler**. In fact, on the spacecraft, the Chinese have offered AUSSAT a relaunch and I think on the order of $60 million for the satellite at a reasonable—at a competitive rate. Arianespace makes a similar offer to U.S. companies.

We have talked about similar arrangements with the U.S. suppliers. They can address—they will be following, they can address that more clearly.

I believe the impact—the impact of these arrangements is not so much on the total price of the launch, plus insurance, but on the uncertainty. The insurance market won't write launch insurance before—

The **Chairman**. What do you mean, uncertainty?

Mr. **Koehler**. On the uncertainty of how much it will cost. Let me explain. We can't buy launch insurance in London until about six months before launch, in some cases even closer to the launch than that. Rates have been highly variable—

The **Chairman**. Because it's not available in the marketplace?

Mr. **Koehler**. Not available; they will not sell it farther in advance.

Well, rates vary—have been varying substantially, and changes in insurance rates that we have observed are sufficient to turn a good business deal into a bad business deal, so what the launch vehicle suppliers have been offering is a guarantee of partial insurance, reflights, and a block of coverage on the satellite, at a rate that they are willing to commit to a year or two in advance, and that is terribly important.

Now the Chinese are making arrangements—

The **Chairman**. So you are saying—excuse me, you were saying that the American company has to nail itself down in a fixed price, I would assume, two years before—or maybe at least a year and a half before they could get an actual price at that given point?

Mr. **Koehler**. That is correct. In some contracts we have had to do that.

The **Chairman**. And what happens if there's a continual—this is a stupid question—what happens if there's a continual—a substantial change in the—

Mr. **Koehler**. Then we lose money.

The **Chairman**. Too bad, huh?

Mr. **Koehler**. Yes.

The **Chairman**. Which is not the same situation that the Ariane would be faced with, or Long March, for that matter.

Mr. **Koehler**. Well, that's the situation we're trying to—if we use an Ariane or a Long March, they are trying to offset that in part. There is still uncertainty about the final—the price of the final block of insurance, but there is a basic coverage then which is locked in in advance.

The **Chairman**. Well, it's substantial enough to make the difference whether you would deal with this company or that company.

Mr. **Koehler**. Oh, it's an important consideration.

The **Chairman**. Okay.

Any further questions? Mr. Nelson, do you have any further questions? No.

I guess that's all. I don't really have any further questions. Anybody have any further questions? We have some in writing that we would be submitting to you, if you would be kind enough to let us know your view on it.

We want to thank you very much. Your testimony has been very, very helpful to us.

Now our next panel—and we're getting there now—is our domestic launch industry, and we have representing, on this particular panel, we have Dr. Alan Lovelace, Vice President and General Manager of General Dynamics Corporation, San Diego, California, and Mr. Richard E. Brackeen, President, Martin Marietta Commercial Titan, Inc., Martin Marietta Aerospace, Denver, Colorado. We want to welcome both of you to the committee. I know you have been listening to the dialogue all day.

What we would like to have you do is your statements will appear in full in the record, and that will give us a chance to have the opportunity to exchange views with you, I think a little more dynamically, but you can do it as you choose.

Dr. Alan Lovelace. Dr. Lovelace.

STATEMENTS OF DR. ALAN LOVELACE, VICE PRESIDENT AND GENERAL MANAGER, GENERAL DYNAMICS CORPORATION, SAN DIEGO, CALIFORNIA; AND MR. RICHARD E. BRACKEEN, PRESIDENT, MARTIN MARIETTA COMMERCIAL TITAN, INC., MARTIN MARIETTA AEROSPACE, DENVER, COLORADO.

Mr. Lovelace. Thank you, Mr. Chairman. I will try to condense my verbalization of my statement, but there are some aspects of it that I would like to focus on since I think unfortunately I bring to you more questions than I bring answers. It seems to be the nature of this discussion.

There is a major policy decision that is masked or embedded in this export license request, and it certainly is the intention of your hearings here, and our participation in it, to ventilate that.

We are an embryonic business, the commercial expendable launch vehicle industry in the United States. We certainly entered this market fully appreciative of the fact that we would be in serious competitions, and we are daily in competitions, both domestically and internationally.

We have no quarrel with the Hughes Company and their pursuit of this license request. I suspect that each of us, if put in that position, would in fact service our customer—I hope we would service our customer as well as they are servicing AUSSAT.

Indeed, as I read the statement again this morning, I would have to say we have no quarrel either with the PRC or with Australia. The fact of the matter is, there is a serious issue here, not a personal issue.

As we understand the Presidential decision, it establishes three areas that require government-to-government agreements before the licenses are issued. And when I am asked how I feel about such a decision, my response can only be "I don't know." And the reason I don't know is I have the same questions that I am sure the members of this committee also have, and until we understand just what the conditions are, and how these will be arrived at and monitored, it's really impossible for me to take a position.

There are questions that come to my mind regarding the conditions. Since the integration of the spacecraft with the launch vehicle requires the interchange of technical information about each—namely the launch vehicle and the satellite—the question of how we can prevent the Chinese from gaining considerable information about state-of-the-art satellites such as the Hughes HS601, one of the newer U.S. satellite designs, how we prevent that from happening, is certainly one of the questions.

In general, contracts of the nature that generated this export license request will have strong mission success and schedule incentives, and historically U.S. satellite manufacturers and launch vehicle companies have worked closely together in integrating their combined technical capabilities, resulting in an enviable record of success.

We would expect responsible U.S. industries to do no less in relation to the PRC, and this will result in the transfer of the most valuable U.S. technology, namely three decades of learning on such subjects as spacecraft integration, launch support, ground operations, just to name a few. And it raises the question: Is this technology transfer desirable? And if not, how will it be controlled and monitored?

There are instances in which spacecraft have been recovered intact following a failure in the early part of the launch phase. How can we be assured that U.S. personnel will recover the spacecraft which may be a number of miles downrange? If such is not the case, what assurances do we have that satellites will be returned to the U.S. without compromise of the technology?

The Department of State says there will be an agreement to prevent possible unfair Chinese pricing or trade practices. Will this condition be satisfied for the first launch? What is the procedure by which an international fair market price will be determined? Are there examples of earlier agreements that prevent unfair pricing or trade practices by a controlled economy such as China?

The Chinese have stated they will increase their prices for Long March, but they will still be less than the U.S. and Arianespace prices. What will these prices be? Can the U.S. industry still compete? And what will be the resultant disruption in the marketplace?

The Presidential decision states that the agreements will be such that the commercial U.S. launch industry will be protected. One of the schemes suggested is that the Chinese will be limited to perhaps four U.S.-built satellite launches per year.

The European countries will be forced, I believe, to offer the same conditions to protect their satellite builders. How can this approach be rationalized with the President's objectives, in view of the limited annual market for satellite launches?

Such an approach will surely force one or more of the U.S. companies out of the commercial business.

Furthermore, it is not evident how such a policy can be rationalized relative to allowing the use of the USSR's Proton launch vehicle. Will this cause a change in the U.S. current policy to not allow the launch of U.S. satellites on the Russian launch vehicle?

If not, can we sustain this double standard?

In all of this, I believe we have the responsibility to integrate our actions with those of our European colleagues. Is this being done?

And finally, Mr. Chairman, the question that I think is fundamental for your deliberations is, namely, what's the hurry? Congress is being asked to ratify these agreements in advance of their being negotiated. While you may be asked to agree in haste, we may all repent at leisure if these agreements are not satisfactory.

Some have argued that Congress can always raise objections later, but realistically it will be very difficult to have the subject raised again on your busy agenda.

It will also be unfair to China, to Australia, to the satellite and the launch industries to leave a threat of later Congressional action pending.

My recommendation would be to ask the Department of State to resubmit the export license statement when the agreements have been concluded. Proceeding in this fashion would provide a stable, long-standing policy, clearly understood by all parties from the outset, and applicable to the initial export license request, as well as any future request pending before the State Department.

Mr. Chairman, there are two industries, two U.S. industries that are involved with this issue, the satellite industry and the commercial launch vehicle industry. The commercial launch vehicle industry is about a year and a half old.

I was heartened by your remarks earlier that you committed not to throw the baby out with the bath water, because we are the baby.

I thank you for the opportunity to express my opinions here today.

[The prepared statement of Dr. Alan Lovelace follows:]

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

U.S. HOUSE OF REPRESENTATIVES

STATEMENT BY:

DR. ALAN M. LOVELACE

PRESIDENT

GENERAL DYNAMICS - COMMERCIAL LAUNCH SERVICES

MR. CHAIRMAN,

I COMMEND YOU AND MEMBERS OF YOUR COMMITTEE FOR CALLING THIS HEARING. IT IS OBVIOUS THAT YOU UNDERSTAND THE IMPORTANCE OF LISTENING TO ALL POSITIONS ON THIS EXTREMELY IMPORTANT SUBJECT. GRANTING OF EXPORT LICENSES TO U.S. BUILT SATELLITES FOR LAUNCH ON THE CHINESE LONG MARCH VEHICLE CAN HAVE FAR-REACHING CONSEQUENCES ON OUR WHOLE NATIONAL STRATEGIC PICTURE. SUCH ACTION SHOULD ONLY BE UNDERTAKEN AFTER A CLEAR AND UNAMBIGUOUS UNDERSTANDING OF ALL OF THE CONDITIONS THAT ARE ATTACHED THERETO.

AS A MEMBER OF THE EMBRIONIC U.S. EXPENDABLE LAUNCH VEHICLE INDUSTRY, WHICH HAS NOT EVEN HAD ITS FIRST LAUNCH, WE PREFER THAT NO SUCH LICENSE BE GRANTED TO ANY COUNTRY THAT DOES NOT HAVE A FREE MARKET ECONOMY. THE FUNDAMENTAL REASON IS THAT THOSE WITH A CONTROLLED ECONOMY CAN CHARGE ANY PRICES THEY CHOOSE. THEY ARE NOT ACCOUNTABLE TO THEIR SHAREHOLDERS AS WE ARE.

BUT, AS GOOD CITIZENS, WE ALSO UNDERSTAND THAT THERE ARE OTHER IMPORTANT NATIONAL INTERESTS INVOLVED THAT MAY WARRANT GIVING SERIOUS CONSIDERATION TO THE GRANTING OF SUCH EXPORT LICENSES. UNDOUBTEDLY THERE ARE MANY SUCH ELEMENTS THAT ENTERED INTO THE PRESIDENTIAL DECISION OF 9 SEPTEMBER.

I WOULD LIKE TO STRESS THAT WE HAVE NO QUARREL WITH HUGHES ON THIS ISSUE. THEY ARE RESPONDING TO THE WISHES OF THEIR CUSTOMER, AUSSAT, AND AUSSAT NATURALLY IS INTRIGUED BY THE LARGE PRICE ADVANTAGE OF USING LONG MARCH. OUR CONCERN IS OVER THE ESTABLISHMENT OF A NEW GOVERNMENT POLICY WHICH IS CONTRARY TO THE PREVIOUS POLICIES UNDER WHICH THE U.S. COMMERCIAL LAUNCH SERVICES INDUSTRY WAS ESTABLISHED.

THERE ARE THOSE WHO CLAIM OUR OBJECTION TO APPROVAL OF SUCH LICENSES IS THAT WE FEAR COMPETITION. IF THIS WERE TRUE, WE DEFINITELY WOULD NOT HAVE ENTERED THIS BUSINESS. GENERAL DYNAMICS IS IN A CONTINUOUS, SPIRITED, BUT FAIR COMPETITION WITH MARTIN MARIETTA AND MCDONNELL DOUGLAS FOR PROVIDING THE LAUNCH SERVICES FOR U.S. AND INTERNATIONAL SATELLITES, AND WE ARE ALL COMPETING WITH ARIANESPACE. THESE ARE THE RISKS WE ASSUMED AS WE MADE THE DECISIONS TO INVEST HEAVILY TO BECOME MEMBERS OF THE U.S. COMMERCIAL LAUNCH INDUSTRY GROUP WHEN STRONGLY ENCOURAGED BY THE PRESIDENT AND BY THE CONGRESS. WHAT WE FEAR IS UNFAIR COMPETITION, WHICH CAN VERY EASILY RESULT WITHOUT CAREFULLY CRAFTED CONDITIONS IN THE GRANTING OF THESE EXPORT LICENSES.

AS WE UNDERSTAND IT, THE PRESIDENTIAL DECISION ESTABLISHES THREE AREAS REQUIRING GOVERNMENT-TO-GOVERNMENT AGREEMENTS BEFORE THE LICENSES ARE ISSUED. WHEN I AM ASKED HOW I FEEL ABOUT SUCH A DECISION, MY

RESPONSE CAN ONLY BE "I DON'T KNOW". I HAVE THE SAME QUESTIONS THAT I AM SURE THE MEMBERS OF THIS COMMITTEE ALSO HAVE. UNTIL WE UNDERSTAND JUST WHAT THE CONDITIONS ARE, AND HOW THESE WILL BE ARRIVED AT AND MONITORED, IT IS IMPOSSIBLE FOR ME TO TAKE A POSITION.

MR. CHAIRMAN, HERE ARE SOME OF THE QUESTIONS THAT COME TO MY MIND REGARDING THE CONDITIONS THE PRESIDENT MADE AS PREREQUISITES FOR APPROVAL.

SINCE THE INTEGRATION OF SPACECRAFT WITH A LAUNCH VEHICLE REQUIRES THE INTERCHANGES OF MUCH TECHNICAL INFORMATION ABOUT EACH, HOW CAN WE PREVENT THE CHINESE FROM GAINING CONSIDERABLE INFORMATION ABOUT STATE OF THE ART SATELLITES SUCH AS THE HUGHES HS601, ONE OF OUR NEWEST U.S. SATELLITE DESIGNS?

IN GENERAL CONTRACTS OF THE NATURE THAT GENERATED THIS EXPORT LICENSE REQUEST WILL HAVE STRONG MISSION SUCCESS AND SCHEDULE INCENTIVES. HISTORICALLY U.S. SATELLITE MANUFACTURERS AND LAUNCH VEHICLE COMPANIES HAVE WORKED CLOSELY TOGETHER IN INTEGRATING THEIR COMBINED TECHNICAL CAPABILITIES RESULTING IN AN ENVIABLE RECORD OF SUCCESS. WE WOULD EXPECT THE RESPONSIBLE U.S. INDUSTRIES TO DO NO LESS IN RELATION TO THE PRC. THIS WILL RESULT IN THE TRANSFER OF THE MOST VALUABLE U.S. TECHNOLOGY NAMELY THREE DECADES OF LEARNING ON SUCH SUBJECTS AS; SPACE CRAFT INTEGRATION, LAUNCH SUPPORT, GROUND OPERATIONS TO NAME A FEW. THIS

RAISES THE QUESTIONS: IS THIS TECHNOLOGY TRANSFER DESIRABLE? IF NOT HOW WILL IT BE CONTROLLED AND MONITORED.

THERE ARE A NUMBER OF INSTANCES IN WHICH SPACECRAFT HAVE BEEN RECOVERED INTACT FOLLOWING A FAILURE IN THE EARLY PART OF THE LAUNCH PHASE. HOW CAN WE BE ASSURED THAT U.S. PERSONNEL WILL RECOVER THE SPACECRAFT, WHICH MAY BE A NUMBER OF MILES DOWNRANGE? IF SUCH IS NOT THE CASE, WHAT ASSURANCES DO WE HAVE THAT THE SATELLITE WILL BE RETURNED TO THE U.S. WITHOUT COMPROMISE OF THE TECHNOLOGY.

THE DEPARTMENT OF STATE SAYS THERE WILL BE AN AGREEMENT TO PREVENT POSSIBLE UNFAIR CHINESE PRICING OR TRADE PRACTICES. WILL THIS CONDITION BE SASTISFIED FOR THE FIRST LAUNCH? WHAT IS THE PROCEDURE BY WHICH AN INTERNATIONAL FAIR MARKET PRICE WILL BE DETERMINED? ARE THERE EXAMPLES OF EARLIER AGREEMENTS THAT PREVENT UNFAIR PRICING OR TRADE PRACTICES BY A CONTROLLED ECONOMY SUCH AS CHINA? THE CHINESE HAVE STATED THAT THEY WILL INCREASE THEIR PRICES FOR LONG MARCH, BUT THEY WILL STILL BE LESS THAN U.S. AND ARIANESPACE PRICES. WHAT WILL THESE PRICES BE, AND CAN THE U.S. INDUSTRY STILL COMPETE WITH THEM? WHAT WILL BE THE RESULTANT DISRUPTION OF THE MARKET PLACE?

THE PRESIDENTIAL DECISION STATES THAT THE AGREEMENTS WILL BE SUCH THAT THE COMMERCIAL U.S. LAUNCH INDUSTRY WILL BE PROTECTED. ONE OF THE SCHEMES SUGGESTED IS THAT THE CHINESE WILL BE LIMITED TO PERHAPS FOUR U.S. BUILT SATELLITE

LAUNCHES PER YEAR. THE EUROPEAN COUNTRIES WILL BE FORCED TO OFFER THE SAME CONDITIONS TO PROTECT THEIR SATELLITE BUILDERS. HOW CAN THIS APPROACH BE RATIONALIZED WITH THE PRESIDENT'S OBJECTIVE, IN VIEW OF THE LIMITED ANNUAL MARKET FOR SATELLITE LAUNCHES? SUCH AN APPROACH WILL SURELY FORCE ONE OR MORE OF THE U.S. COMPANIES OUT OF THE COMMERCIAL BUSINESS. FURTHERMORE IT IS NOT EVIDENT HOW SUCH A POLICY CAN BE RATIONALIZED RELATIVE TO ALLOWING THE USE OF THE USSR'S PROTON LAUNCH VEHICLE. WILL THIS CAUSE A CHANGE IN THE U.S. CURRENT POLICY TO NOT ALLOW THE LAUNCH OF U.S. SATELLITES ON THE RUSSIAN LAUNCH VEHICLE? IF NOT CAN WE SUSTAIN THIS DOUBLE STANDARD? IN ALL OF THIS I BELIEVE WE HAVE RESPONSIBILITY TO INTEGRATE OUR ACTIONS WITH THOSE OF OUR EUROPEAN COLLEAGUES. IS THIS BEING DONE?

AND FINALLY MR. CHAIRMAN, THE QUESTION THAT I THINK IS FUNDAMENTAL FOR YOUR DELIBERATIONS. NAMELY, WHAT'S THE HURRY? CONGRESS IS BEING ASKED TO RATIFY THESE AGREEMENTS IN ADVANCE OF THEIR BEING NEGOTIATED. WHILE YOU MAY BE ASKED TO AGREE IN HASTE, WE ALL MAY REPENT AT LEISURE, IF THESE AGREEMENTS ARE NOT SATISFACTORY. SOME HAVE ARGUED THAT CONGRESS CAN ALWAYS RAISE OBJECTIONS LATER, BUT REALISTICALLY, IT WILL BE VERY DIFFICULT TO HAVE THE SUBJECT RAISED AGAIN ON YOUR BUSY AGENDA. IT WILL ALSO BE UNFAIR TO CHINA, AUSTRALIA, THE SATELLITE, AND THE LAUNCH INDUSTRIES TO LEAVE A THREAT OF LATER CONGRESSIONAL ACTION PENDING. MY RECOMMENDATION WOULD BE TO ASK THE DEPARTMENT OF STATE TO RESUBMIT THE EXPORT LICENSE

STATEMENT WHEN THE AGREEMENTS HAVE BEEN CONCLUDED. PROCEEDING IN THIS FASHION WOULD PROVIDE A STABLE LONG STANDING POLICY CLEARLY UNDERSTOOD BY ALL PARTIES FROM THE OUTSET AND APPLICABLE TO THE INTIAL EXPORT LICENSE REQUEST AS WELL AS ANY FUTURE REQUESTS PENDING BEFORE THE STATE DEPARTMENT.

MR. CHAIRMAN, WE HAVE MORE QUESTIONS THAN ANSWERS. THANK YOU FOR THE OPPORTUNITY TO MAKE MY VIEWS KNOWN.

The **Chairman**. Thank you, Dr. Lovelace.

Mr. Brackeen.

Mr. **Brackeen**. Thank you, Mr. Chairman.

You have my written statement, and I know you have had a long, arduous day, and so I am going to try to summarize briefly from what I have already provided you about this very complex issue.

As you know, since the Administration's announcement, we have spent considerable time trying to assess the impact on our business plans of this proposed export approval, and we are looking for an informed and balanced judgment when we give you our opinions.

Incidentally, I, like John Koehler, seemed to have been briefing a considerable fraction of the population of U.S. government officials, including many of you, in the last week or so on this.

I would like to begin by noting that the State Department has reiterated that the Administration is determined to assure the ability of our industry to compete on an equal footing, and that it has reaffirmed its policy of promoting and encouraging this commercial launch industry, and that is something we applaud.

We applaud the intent that underlies that.

Mr. Chairman, we remain critically concerned, however, as to the substance and the outcome of the negotiations that have been discussed here today, the negotiations to preserve that competitive capability.

All the policy initiatives that have been described earlier today, such as the Commercial Space Launch Act of '84 and the Administration's many incentives and policies for privatizing the space business, testify that the U.S. Government does believe that a healthy commercial space transportation industry is an important national asset, an attribute. And I think after the last two years, we can all agree on that.

Yes, we and the other major launch vehicle companies did look at the marketplace, and did assess the capability of our products to compete, and taken together with the incentives and the policies, we went ahead and invested in significant improvements in our launch vehicle capability and launch pads, and even more in working capital, to begin the production lots of our first few commercial launch vehicles, not all of which are as of yet sold, I might add.

I simply should close this comment by saying these investments are far from being recovered at this time. We have had some initial successes, as you have heard in earlier testimony. However, the first U.S. commercial launch has yet to occur. Unfortunately, the European program, Ariane, captured more than one half of the market before U.S. firms were even authorized to submit firm bids.

Now the industry is entering a significantly more competitive phase, I think, as testified by the issue before you, for launches in 1991 and beyond.

In addition to that, our projections now estimate a somewhat reduced international demand for commercial satellite launchings in those outyears; maybe as few as 17 or so per year.

I guess the point of this comment is that this newly emerging business sector has yet to reach a level of stability and an outlook that would warrant a high degree of optimism.

Mr. Chairman, when Hughes Aircraft Corporation, in response to the inquiry from the Australian program, asked our views about the use of the Long March, we summarized them in four major areas.

We first thought that a U.S. decision to permit the launch of an American satellite on the Long March certainly seemed inconsistent with the then-existing body of U.S. space policies.

Second, we cited our belief that such a launch, as you heard, might involve a risk of unintended technology transfer. And you have heard much testimony on that.

Further, we wondered about a national security issue that might underwrite the upgrade of the Chinese Long March to more than double its current lift capability.

But, finally and most importantly, I think, and most appropriately for us, we saw significant trade issues in the prices being offered by the Chinese Government, a non-market economy, for these launch services.

Honestly, Mr. Chairman, we continue to feel these concerns. As I expressed to the many members of the interagency group that has been grappling with this tough issue, we have concluded that American launch companies simply cannot compete against a foreign government program that seems totally independent of free market prices or pressures, and whose pricing decisions seem driven by other things, things like foreign exchange needs, foreign policy considerations, rather than the private enterprise factors of cost and return on investment that we must deal with.

Well, the Administration has now stated its intent to approve the export of these satellites, at least for launching in China, conditional upon these various agreements that you have heard discussed; most importantly for us, conditional on some kind of agreement on international fair trade practices.

In the absence of a thoughtful and balanced and comprehensive trade policy, we think the entry by a foreign government, especially one such as China, into this marketplace is undoubtedly going to disrupt and undermine the viability of these initial privately financed companies that we have started.

We think that the effort and time required to define the substance and terms of such an agreement in the context of an overall space policy is a significant challenge.

As you may know, the Office of the United States Trade Representative has for the last couple of years been conducting informal discussions with the European Space Agency on a very similar issue, on a level and balanced playing field, between the American private companies and the Ariane program.

I can report to you while I believe these discussions have been positive and cooperative, those issues are also complex and have required very lengthy bilateral discussions and domestic consultations. Achieving a trade agreement with the Chinese of the nature contemplated by this export request would surely be significantly more complex. And I wonder if it might not also require a multilateral dialogue that includes the Europeans.

Mr. Chairman, the Office of the USTR has started discussions with us. I had a discussion the day before yesterday in his effort to define the options and alternatives for this bilateral trade agreement with the Chinese. But these discussions are only just beginning, and at this time neither the launch industry nor, I think, you and your advisors have seen any specific proposals or proposed solutions to this difficult important trade issue.

So in concluding, I would like to say that Martin Marietta believes that it is critical that the Congress have the opportunity to consider the specifics of these important agreements, and so that they can address the full impact of these proposed export approvals.

For reasons stated above, I would agree with Dr. Lovelace that we would suggest the Congress request a resubmittal of this export notification after these agreements are negotiated and available for your review.

I would like to thank you again for soliciting our views, and I would be happy to answer any questions.

[The prepared statement of Mr. Richard Brackeen follows:]

STATEMENT OF

RICHARD E. BRACKEEN

PRESIDENT, MARTIN MARIETTA COMMERCIAL TITAN, INC.

BEFORE THE

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

U.S. HOUSE OF REPRESENTATIVES

SEPTEMBER 23, 1988

CHAIRMAN ROE AND MEMBERS OF THE COMMITTEE, I WELCOME THIS OPPORTUNITY TO COME BEFORE YOU TODAY TO DISCUSS THE ADMINISTRATION'S INTENT TO APPROVE, SUBJECT TO CERTAIN CONDITIONS, PENDING LICENSE APPLICATIONS FOR THE EXPORT OF U.S. MANUFACTURED SATELLITES TO THE PEOPLES REPUBLIC OF CHINA FOR LAUNCH ABOARD THE CHINESE GOVERNMENT'S LONG MARCH BOOSTER.

WE NOTE THAT THE STATE DEPARTMENT HAS STATED THAT THE ADMINISTRATION "IS DETERMINED TO ASSURE THE ABILITY OF THE U.S. COMMERCIAL LAUNCH INDUSTRY TO COMPETE ON AN EQUAL FOOTING WITH LAUNCHES FROM A NON-MARKET ECONOMY", AND THAT IT "REAFFIRMS ITS POLICY OF PROMOTING AND ENCOURAGING A STRONG U.S. COMMERCIAL LAUNCH INDUSTRY".

WE APPLAUD THESE STATEMENTS AND THE INTENT THAT UNDERLIES THEM. WE REMAIN CRITICALLY CONCERNED, HOWEVER, AS TO THE SUBSTANCE AND OUTCOME OF THE NEGOTIATIONS CALLED FOR IN THE ADMINISTRATION'S RECENT DECISION, PARTICULARLY THOSE RELATING TO THE AGREEMENT "TO PREVENT

POSSIBLE UNFAIR CHINESE PRICING OR TRADE PRACTICES RELATING TO LAUNCH COMPETITIONS".

BEFORE I FURTHER DESCRIBE OUR CONCERNS, I WOULD LIKE TO PROVIDE YOU WITH SOME BACKGROUND THAT I BELIEVE WILL BE USEFUL IN EVALUATING THE ISSUES BEFORE YOU. AS I TESTIFIED BEFORE YOUR SUBCOMMITTEE ON SPACE SCIENCE AND APPLICATIONS ON FEBRUARY 17, 1988, OUR INDUSTRY RESPONDED TO CLEAR POLICY INITIATIVES BY BOTH THE CONGRESS AND THE ADMINISTRATION IN DECIDING TO ENTER THE COMMERCIAL LAUNCH SERVICES BUSINESS. THESE POLICIES WERE ESTABLISHED BY THE CONGRESS IN THE COMMERCIAL SPACE LAUNCH ACT OF 1984, AND ARE BEING REAFFIRMED IN THE AMENDMENTS TO THIS ACT PASSED UNANIMOUSLY BY THE HOUSE OF REPRESENTATIVES LAST MAY, AND REPORTED OUT OF THE SENATE COMMERCE COMMITTEE JUST THIS WEEK, ALSO BY UNANIMOUS VOTE. IN THE CASE OF THE ADMINISTRATION, KEY COMMERCIAL LAUNCH SERVICES OBJECTIVES HAVE BEEN SET FORTH IN VARIOUS PRESIDENTIAL POLICY STATEMENTS AND NATIONAL SECURITY DIRECTIVES, AND REAFFIRMED AS RECENTLY AS LAST FEBRUARY IN THE PRESIDENT'S SPACE POLICY INITIATIVES.

ALL THESE POLICY ELEMENTS TESTIFY THAT THE U.S. GOVERNMENT BELIEVES THAT A HEALTHY COMMERCIAL SPACE TRANSPORTATION INDUSTRY IS A NATIONAL STRATEGIC ASSET. AS A RESULT, WE, TOGETHER WITH OTHER MAJOR LAUNCH VEHICLE MANUFACTURERS, INVESTED SIGNIFICANT AMOUNTS IN LAUNCH PAD AND LAUNCH VEHICLE IMPROVEMENTS. ALL THREE COMPANIES ALSO INVESTED CONSIDERABLY MORE IN WORKING CAPITAL REQUIRED TO CONSTRUCT OUR FIRST LOT OF COMMERCIAL VEHICLES, NOT ALL OF WHICH ARE AS YET SOLD. THESE INVESTMENTS ARE FAR FROM BEING RECOVERED AT THIS TIME.

ACCORDING TO A RECENT DEPARTMENT OF TRANSPORTATION STUDY, THE THREE COMPANIES AND THEIR SUBCONTRACTORS CURRENTLY EMPLOY APPROXIMATELY 15,000 PEOPLE IN THE U.S. COMMERCIAL LAUNCH SERVICES INDUSTRY. FURTHER, OUR INDUSTRY EXPECTS TO CONTRIBUTE UP TO $1 BILLION YEARLY TO THE U.S. BALANCE OF PAYMENTS, AND UP TO $175 MILLION IN DIRECT FEDERAL, STATE, AND LOCAL TAX REVENUES. MARTIN MARIETTA'S FIRST COMMERCIAL LAUNCH IS PLANNED FOR NEXT AUGUST, AND WILL CARRY THE JAPANESE JC-SAT SATELLITE AND THE UNITED KINGDOM'S SKYNET 4 SATELLITE.

ALL THREE MAJOR U.S. COMPANIES HAVE HAD INITIAL SUCCESSES IN THIS MARKETPLACE. SINCE THE FIRST COMMERCIAL RANGE USE AGREEMENTS WERE EXECUTED BY THE U.S. AIR FORCE IN MID-1987, U.S. FIRMS HAVE WON SEVERAL OF THE COMPETITIVE PROCUREMENTS WORLDWIDE. HOWEVER, WE HAVE HAD TO RECOGNIZE THAT THESE AWARDS HAVE, IN MOST CASES, RESULTED FROM THE FACT THAT THE ARIANE LAUNCH MANIFEST HAD QUICKLY FILLED THROUGH EARLY 1991 BEFORE U.S. LAUNCH FIRMS FIRST ENTERED THE MARKET. THE INDUSTRY IS NOW ENTERING INTO A MUCH MORE TRULY COMPETITIVE PHASE INVOLVING LAUNCHES FOR 1991 AND BEYOND.

TURNING NOW TO THE AUSSAT LAUNCH SERVICES PROCUREMENT THAT IS THE SUBJECT OF THIS HEARING, I WOULD LIKE TO SAY THAT THE CHINESE GOVERNMENT, THROUGH THE GREAT WALL INDUSTRY CORPORATION, HAS, ACCORDING TO TRADE PRESS REPORTS, OFFERED TO LAUNCH THE TWO AUSSAT-B SATELLITES FOR PRICES THAT APPEAR TO BE ONE-THIRD OR LESS OF COMPARABLE WESTERN BIDS. THE PRESS HAS ALSO REPORTED THAT CHINESE AMBASSADOR HAN XU, IN A RECENT LETTER TO THE CONGRESS, STATED THAT CHINA IS ABLE TO OFFER LOWER PRICES BECAUSE OF "RELATIVELY LOW" LABOR

COSTS AND GREAT WALL INDUSTRY CORPORATION'S "PRACTICE OF SEEKING NO HIGH PROFITS". HE WENT ON TO SAY THAT "OF COURSE, FUTURE LAUNCH SERVICE PRICES WILL NOT NECESSARILY REMAIN THE SAME. THEY MIGHT BE READJUSTED. GENERALLY SPEAKING, HOWEVER, CHINA'S LAUNCH SERVICE PRICES WILL STAY FAVORABLE."

WHEN HUGHES AIRCRAFT CORPORATION, IN RESPONSE TO THE AUSTRALIAN DECISION TO CONSIDER USE OF THE LONG MARCH LAUNCH VEHICLE, ASKED OUR VIEWS, MARTIN MARIETTA CITED FOUR AREAS OF CONCERN. FIRST, WE STATED THAT A U.S. DECISION TO PERMIT THE LAUNCH OF A U.S. SATELLITE ON THE LONG MARCH VEHICLE SEEMED INCONSISTENT WITH THE THEN EXISTING U.S. SPACE POLICY. SECOND, WE CITED OUR BELIEF THAT SUCH A LAUNCH WOULD INVOLVE A SERIOUS RISK OF UNINTENDED TECHNOLOGY TRANSFER. THIRD, WE SAW A POTENTIAL NATIONAL SECURITY ISSUE IN THE UNDERWRITING OF AN UPGRADE OF THE LONG MARCH LAUNCH VEHICLE THAT WOULD DOUBLE ITS LIFT CAPABILITY. FINALLY, WE SAW SIGNIFICANT TRADE ISSUES IN THE PRICES BEING OFFERED BY THE CHINESE GOVERNMENT FOR THESE LAUNCH SERVICES.

WE CONTINUE TO FEEL THESE CONCERNS. AS I HAVE TOLD KEY MEMBERS OF THE INTERAGENCY GROUP GRAPPLING WITH THIS EXPORT REQUEST, AMERICAN LAUNCH COMPANIES CANNOT COMPETE AGAINST A FOREIGN GOVERNMENT PROGRAM THAT IS TOTALLY INDEPENDENT OF FREE MARKET PRESSURES, AND WHOSE PRICING DECISIONS SEEM DRIVEN BY FOREIGN EXCHANGE NEEDS AND FOREIGN POLICY CONSIDERATIONS RATHER THAN PRIVATE ENTERPRISE CONSIDERATIONS OF COST AND RETURN ON INVESTMENT.

THE ADMINISTRATION HAS NOW STATED ITS INTENT TO APPROVE THE EXPORT OF U.S. SATELLITES FOR LAUNCHING IN CHINA, CONDITIONAL UPON THE EXECUTION OF GOVERNMENT-TO-GOVERNMENT AGREEMENTS RELATIVE TO SAFEGUARDING U.S. TECHNOLOGY, LAUNCH ACCIDENT LIABILITY, AND, IMPORTANTLY FOR THE U.S. LAUNCH SERVICES INDUSTRY, AN AGREEMENT ON PRICING AND FAIR TRADE PRACTICES.

THE POTENTIAL IMPACTS OF THIS DECISION ON THE U.S. COMMERCIAL SPACE LAUNCH INDUSTRY ARE SIGNIFICANT. IN THE ABSENCE OF A THOUGHTFUL, BALANCED AND COMPREHENSIVE TRADE POLICY, THE ENTRY BY A FOREIGN GOVERNMENT, ESPECIALLY THAT OF A NON-MARKET ECONOMY SUCH AS CHINA, INTO A FREE-ENTERPRISE MARKETPLACE WILL UNDOUBTEDLY DISRUPT AND UNDERMINE THE VIABILITY OF PRIVATELY FINANCED COMPANIES.

WHILE THE U.S. GOVERNMENT INTENDS TO CONCLUDE A TRADE AGREEMENT PRIOR TO FINAL EXPORT APPROVAL, WE BELIEVE THAT THE EFFORT AND TIME REQUIRED TO DEFINE THE SUBSTANCE AND TERMS OF SUCH AN AGREEMENT, IN THE CONTEXT OF A POSITIVE AND COHERENT COMMERCIAL SPACE LAUNCH POLICY, IS A SIGNIFICANT CHALLENGE.

FURTHER, AS YOU MAY KNOW, THE OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE, SUPPORTED BY REPRESENTATIVES FROM OTHER EXECUTIVE AGENCIES, HAS SINCE 1987, BEEN CONDUCTING INFORMAL TRADE DISCUSSIONS WITH THE EUROPEAN SPACE AGENCY ON THE APPROACH AND MECHANISMS TO ACHIEVE A "LEVEL AND BALANCED PLAYING FIELD" BETWEEN THE U.S. PRIVATE LAUNCH COMPANIES AND EUROPE'S ARIANE PROGRAM. WHILE THESE DISCUSSIONS HAVE BEEN POSITIVE AND COOPERATIVE, THE ISSUES ARE COMPLEX AND HAVE REQUIRED LENGTHY BILATERAL DISCUSSIONS AND DOMESTIC

CONSULTATIONS. ACHIEVING A TRADE AGREEMENT WITH THE CHINESE OF THE NATURE CONTEMPLATED BY THIS EXPORT LICENSE REQUEST WOULD SURELY BE SIGNIFICANTLY MORE COMPLEX, AND MIGHT ALSO REQUIRE A MULTI-LATERAL DIALOGUE THAT INCLUDES THE EUROPEANS.

FURTHER, WHILE THE SPECIFIC EXPORT LICENSE REQUESTS BEFORE THE CONGRESS RELATE TO THREE SATELLITES ONLY, ACCORDING THE PRESS STATEMENTS THE CHINESE GOVERNMENT SEEKS A CONTINUED, SUBSTANTIAL PARTICIPATION IN THE COMMERCIAL SERVICES LAUNCH ARENA. WE ARE GRATIFIED THAT THE OFFICE OF THE U.S. TRADE REPRESENTATIVE HAS RECENTLY INITIATED EFFORTS TO DEFINE OPTIONS AND APPROACHES FOR CONSIDERATION IN A BILATERAL TRADE AGREEMENT WITH THE CHINESE GOVERNMENT, BUT DISCUSSIONS WITH INDUSTRY ON THESE POTENTIAL OPTIONS ARE ONLY JUST BEGINNING. THUS, AT THIS TIME, NEITHER THE LAUNCH INDUSTRY NOR THE CONGRESS HAS SEEN A SPECIFIC PROPOSAL OR PROPOSED SOLUTION TO THIS DIFFICULT AND IMPORTANT TRADE ISSUE.

IN CONCLUSION, I WOULD LIKE TO SAY THAT MARTIN MARIETTA BELIEVES THAT IT IS CRITICAL THAT THE CONGRESS HAVE THE OPPORTUNITY TO CONSIDER THE SPECIFICS OF THESE IMPORTANT AGREEMENTS IN ORDER TO ADDRESS THE FULL IMPACT OF THE PROPOSED EXPORT APPROVALS. FOR THE REASONS STATED ABOVE, WE SUGGEST THAT THE CONGRESS WITHHOLD APPROVAL OF THESE NOTIFICATIONS UNDER THE ARMS EXPORT CONTROL ACT UNTIL THESE AGREEMENTS ARE NEGOTIATED.

I WOULD LIKE ONCE AGAIN TO EXPRESS MY APPRECIATION FOR THE OPPORTUNITY TO APPEAR BEFORE YOU TODAY. I WILL BE HAPPY TO ANSWER ANY QUESTIONS.

The **Chairman**. You both have done splendidly in your presentation and in your views, but now I'm puzzled. You've sat here all day today. Now suppose we were to reverse our seats. I know you were here most of the day. And you listened to the Australians testify, and they, I think, made it very clear that as far as they were concerned, that if the matter did not go ahead that they would have to reconsider and no doubt would rebid that program. There was no guarantee whatever that that would go to an American firm, and that was why I asked that specific question. So that puts us on the horn of a dilemma now because of the timeframe involved.

Now let's take—and therefore we could lose those contracts, that's $400 or $500 million worth of contracts, whatever the case may be. Now we come back, and we heard the gentleman from Britain testify, United Kingdom, and he said that their concern, in order to get their AsiaSat project, that there was a legitimate business timeframe—there was a legitimate business timeframe that they were worried about, and that gave rise to their getting into that marketplace at all. Otherwise, there was grave danger of the—from the Army point of view, of the Soviets and the Japanese capturing that entire marketplace. And there was an existing retrieved satellite that they were—Hughes was going to redo for them and the whole bit, and there was a timeframe to do that. That's at least what they testified to, and there's no reason we should doubt that.

We speak of technology transfer, and I'm puzzled about another point there. What happens if a satellite is produced in Britain, or a satellite is produced in—what is it, consortium between France and Britain, and that satellite were to be launched on the Long March rocket. Would not that technology of their launching that satellite, as they've done, as we do, be transferred to the Chinese under that same premise that you have projected?

Mr. **Brackeen**. Mr. Chairman, I simply don't personally agree with the conclusion that European satellite manufacturers will transfer their satellites to the Peoples Republic for launch on the Long March. The four European satellite manufacturers are also the four largest Ariane manufacturers.

The **Chairman**. I would suggest that if they were launching a satellite for the Australians and the Australians are paying the bill, that was the issue, and it was $60 million difference, they'd have to think twice about it, too. Because it was the Australians who said they wanted to get the best possible price. And I'm not being facetious. I'm just trying to set the dilemma.

So there is more to the issue, from my point of view, as what we do as far as United States policy is concerned, and how do we develop? And that's the question I want to get to. What do we do in this country to develop the vitality in the marketplace, and what can we do from governmental level so you can compete? That is the issue before us.

Let's just take a hypothetical case, and let's suppose you said, okay, to hell with it, we're not going to let that license go ahead, and we stop it. We'll lose the Hughes contract, we'll lose the other one, the British can go get somebody else and do the—the Arianes will be there for sure. Now what does that benefit our—how does that help to resolve the dilemma we are faced with, the competability, if you like, of our beginning to in our domestic space private launching industry? There's more to it, is what I'm trying to say.

Mr. BRACKEEN. I certainly agree that it is a very complex issue, and that's why we, of course, have testified to you that we need a little bit of time to give you a reasoned response. The one thing that most of us who have been in this business and tried to bring some expert judgment to this is that this question is not necessarily a zero sum game between the U.S. manufacturers of satellites and the U.S. manufacturers of launch vehicles.

The CHAIRMAN. I totally agree. Where I'm trying to come from, if you were sitting here, and we're going to make policy, and we tried to balance these hearings out with every party of interest, including international interest and so forth, what would you do in United States policy to help develop a viable domestic industry? Limit—we can only limit the launching of certain numbers of satellites on domestic—what do you call it, domestically, privately owned?

Go ahead, Dr. Lovelace.

Mr. LOVELACE. Well, Mr. Chairman, it seemed to me there were four questions embedded in your statement that I captured.

I think in the case of availability of launch services to support AsiaSat or AUSSAT, there are several opportunities available to the private consortia that are handling the AsiaSat and the AUSSAT group. I can't speak for my competitor here. I would be delighted to provide a proposal to AsiaSat to launch their satellite, and I believe I can do it on a timeframe that will support their requirements.

The investment that you spoke about and the possible loss of the Hughes contract—and I have heard numbers this morning of $300 million worth of business would be lost—is offset by an even larger loss of an investment that has been made by the private sector in the launch service companies, two of which are at the table before you now.

I can't speak for the Martin company. I can give you our investment in nine significant figures, $288 million, and I represent only one company. That difference is that this is our stockholders' investment, and I guess in some respects I have a hard time equating that to what is apparently prized more highly, $300 million worth of hard currency transfer.

As to the matter of our colleagues in Europe and would they sell their satellites: they are, after all, members of the COCOM community, which we were instrumental in setting up, we the United States, and fostering, and they have taken the position in that august deliberations that they were opposed to allowing the launch of the Western European manufactured satellites.

So we seem to be at some divergence from our colleagues in Europe on this matter.

Finally, to your question of what would I do if I were chairman? I would demand an understanding of the terms and conditions that underlay the export license agreement that is before your committee for approval. We need to understand that, and it needs to be done before the fact, not after the fact.

The **Chairman**. Well, the gentleman from New Jersey wasn't asking the Chairman that he wasn't capable of making his own mind up. I tried to paint a different picture for you. And I don't disagree with you.

I think the point that you have made, that there would be a substantial loss in the launching capability, in investments made, is a valid point, a very valid point. I think that's important to say. But I don't see how any of this is going to change the competitive ability—there's nothing before us that says we should be doing this and that to be more competitive. That's what is puzzling me.

Let's suppose we agree with you. We will go ahead and we do this whole thing and say no, we're not going to do it. How does that improve the competitiveness of your company and Marietta in the international marketplace? And I do call to your attention that the other people who bid did include the Long March rockets, every one of them did, the Europeans.

Mr. **Brackeen**. I agree that they all did, as they should have, because their customer requested a consideration of a Long March in addition to all of their potential launchers.

I think you have asked an excellent question. You know, twice in the last year we have testified before your subcommittee in response to that very kind of question, and we are very gratified, for instance, about the status of H.R. 4399. That's one of the very things I can cite in answer to your question. Something that needed to happen to make American companies more competitive with our international competition was that very bill. It was, I think, passed unanimously in the House and its progress is great in the Senate, as we speak today, and so for that, we thank you. That's an example of what can be done.

The **Chairman**. But now if the gentleman would yield, now we understand you heard Mr. Nelson this morning, there's a veto message that's practically been drafted on the damned thing already. What do you feel about that?

Mr. **Brackeen**. Thankfully, sir, I was not in the room when he said that.

The **Chairman**. Well, he did say it.

Mr. **Brackeen**. This has been a long issue, for a year or so. I think perhaps we will overcome those—

The **Chairman**. What would be the impact on the ELV private industry if it's vetoed?

Mr. **Brackeen**. Certainly initially the ability to approach our boards for shareholders' additional investments would be an impossibility, because, you see, it's not as much the total level of investment that's required, it's the additional total liability that each additional day's participation brings. It's a very small probability, but a very high dollar amount of risk that we take. And we have taken a great deal of risk and I've got to simply tell the Committee that American companies have done a great deal to make themselves competitive.

For instance, this problem with the insurance market that you correctly raised earlier, as we looked at entry into the business, we realized we would have to take a great deal of that risk on our own shoulders so that these U.S. commercial satellite builders and operators could continue to operate.

And so, therefore, I think it's true that every bid received by anyone from an American launch service company gets the guarantee of a re-flight, the financial risk of which is borne by the company, not taken by the insurance industry. And so that's something that we have done.

The state that we're in at this moment, unfortunately, is you've asked us what should we do, and how do we define this policy. I think we're telling you we've had so very little time to try to understand any mechanism, we can't give you an answer.

The CHAIRMAN. The Chair recognizes the distinguished gentleman from New Mexico.

Mr. LUJAN. I've just been very interested in all that discussion, because I think those are the basic things that we have to answer, and we have such a short time in which to review this whole thing, that the decision will be made before we even can get deeply into it.

The big concern has to be with the fledgling launch industry, that we want to encourage, and it doesn't do us any good to say, well, we're not going to—you can't put artificial restraints, anyway, for very long. Those will help for a little bit, and then in the final analysis, why, they're not any good. If you can't compete on the service itself and the cost, why, you're going to be in trouble, anyway.

I don't know. I guess those are the answers that we're looking for, and we'll continue to look for them.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Let me just ask one more question. I don't want to let you get away without answering this one.

All of that notwithstanding, do you consider the insurance issue to be an extremely important issue in your competitive approach aspect in the future?

Mr. BRACKEEN. The answer is yes, and Mr. Chairman, I think it was Dr. Koehler that reported to you that it impacts not only the AUSSAT turnkey competition that's under consideration, but other competitions. It's not only all the kinds of insurance that we think about—and we talked about the House bill, property damage to U.S. government property and third party liability, whose cost we should appropriately bear—but from the satellite operators' point of view, it's insurance that would replace his satellite if it were destroyed, and it's insurance from someone, General Dynamics or Martin Marietta or someone, to give them a new launch, should that happen. And I think he told you that in these competitions, relaunch guarantees and additional blocks of insurance are being offered. And the financial implications are fairly severe in offering that.

Unfortunately, I would say competitive situations that exist today would not allow me to go into more discussion on that.

The CHAIRMAN. But that's going to—no, I understand that, but—

Mr. BRACKEEN. You're on the right track.

The CHAIRMAN. It's got to be part of the—it's got to be a major part of the issue.

Mr. BRACKEEN. It is.

The CHAIRMAN. It would seem to me that if I were going along the way that the Australians are going, and I'm going to deliver a satellite in place in orbit, you know, as a service in orbit and so forth, that relationship between the manufacturer of the satellite, the launch, it's all part of this whole mix.

For example, one other question—and I don't want to keep you too long—that puzzles me, I happen to personally believe—and maybe you share this belief—that a viable private launching capability in the United States is critically important to the United States' overall basic policy in space. I say that categorically. And I think, in my judgment, that the more satellites that we can launch, even government—particularly government satellites—that we can launch privately, should be pursued vigorously. So that when we are looking to those that are launched by the military or whatever, they would be launched on the basis that there would be maybe some other good reason why they should, you know, for that particular purpose. For many reasons. I think the idea of, you know, year-to-year appropriations is a nightmare to try to deal with, and year-to-year appropriation issue as far as the space program, which we have tried to change, as you know, three, five and 10, it was a nightmare and still is a nightmare to deal with.

And it seems to me that we'd be providing a better methodology, if you like, to our own military, because we'd have a robust, hopefully, private enterprise and rockets in reserve and storage and so forth and so on, give us much more flexibility, to say the least.

So if we hope to move in that direction, at the least, from my point, and I'm sure Manuel agrees on that. Is there anything else while we have you here that you can see that this government ought to be doing in a legislative direction or policy direction that gives us a fair shake when we are competing with Ariane, which—what is it, 60 percent by the French government, or whatever it is? Is there any thought you might have?

Mr. LOVELACE. Well, Mr. Chairman, I feel like I owe the Chair an apology—

The CHAIRMAN. Oh, no, no, no.

Mr. LOVELACE.—presuming that you were not as capable as we all know you to be on this subject and others.

I must respond to the question of how you make the industry, the U.S. launch industry competitive, and the answer is pretty simple in my view, and that is, let us compete. And by that I mean if the assumption is that China will be allowed into the world launch market and continue the "introductory pricing" indefinitely, then we will not compete. And we will, as good businessmen, if that is the decision of this Congress, review our business plans and cut our losses. We will have no other alternative.

The CHAIRMAN. Okay. Any other questions?

I want to thank you very much for your patience, for your testimony. We appreciate it, it's a big help to us, and we want to thank you for being here.

Mr. LOVELACE. Thank you, Mr. Chairman.

The CHAIRMAN. Our next witness is Mr. Robert H. Hood, Jr., Vice President of the Aerospace Business Development, McDonnell Douglas Corporation.

I think the reason why they're testifying separately is because it's a little bit of a different problem than existed with our previous two witnesses.

So, Mr. Hood, we have your testimony, and what we will do, of course, is include it in full in the record, and however you feel comfortable, to proceed.

STATEMENT OF ROBERT H. HOOD, JR., VICE PRESIDENT-AEROSPACE BUSINESS DEVELOPMENT, MC DONNELL DOUGLAS CORPORATION.

Mr. Hood. Thank you very much, Mr. Chairman.

As you stated earlier, our position is a little bit different. I will try to summarize my testimony in the best interest of time, but I do, before I go on, want to commend you and the members of your committee for the leadership you have demonstrated by the House passage of the Commercial Space Act Amendments of 1988, and before you ask me the question, I can tell you that if that law does not become law, it will be devastating to our industry, because it is a very young industry and we do need that legislation to take away some of the unknowns in it.

Let me turn my attention now to matters for discussion today. I believe it is essential to present an outline of our involvement with the People's Republic of China. As far as we are concerned, the issues involved are broader than just launch vehicles.

As you are well aware, McDonnell Douglas is a diverse company with a wide variety of products, both military and commercial, and we do have an international interest in the People's Republic of China. The Chinese are an important customer to us, and they are highly regarded.

We have had a relationship with them since 1975, when we introduced a proposal to co-produce the MD-80 series of commercial aircraft in that country.

The Chinese government selected the city of Shanghai for this unique international facility, and on July 31st, 1987, McDonnell Douglas and Shanghai Aviation Industry Corporation, our partner, delivered the first MD-82 aircraft assembled in that facility.

As of this month, we have assembled five aircraft that have been delivered for use within the People's Republic of China.

I am pleased to report that the program continues to do well, that both sides are benefiting, and I believe this is an excellent example of how cooperation can open and enhance new markets to U.S. industry.

Another area of interest is in our space business, and late last July John Yardley, our president of McDonnell Douglas Astronautics Company, traveled to PRC to explore potential joint space ventures.

At that time the Chinese expressed an interest in our PAM, payload assist module, which as you will recall was commercially developed for the shuttle as a compatible upper stage. It had a bright future until the Challenger tragedy, when at that time the U.S. government policy was modified, eliminating commercial launches from the shuttle, and our market for PAM disappeared.

We viewed the Chinese possibility as an opportunity to establish a new market and expand our PAM activities. Those discussions have led to the signing of a technical assistant agreement, the principal approval by the U.S. government for use of PAM on Long March on a case-by-case basis.

Given this diverse set of relationships between McDonnell Douglas Corporation and the PRC, you can perhaps see why our corporation is interested in an export license for launch of U.S. satellites on the Chinese Long March.

In general, we believe that we must continue to vigorously participate in the world market. As a matter of fact, in 1987, 25 percent of McDonnell Douglas' revenues were from international sales.

It is no longer feasible to restrict our products for U.S. use only. With the advances in communication and technology co-production offers an opportunity to capture a greater share of international markets, and contribute positively to our U.S. balance of trade.

For example, in the joint efforts with PRC, our revenue share on the MD-82 has contributed nearly $1 billion over the last six years towards a positive trade balance.

It is also true that an additional benefit of international sales is the reduced cost of our products to U.S. government. The taxpayer benefits when development costs can be spread over a larger customer base.

Mr. Chairman, as we understand it, the proposed export license submission to Congress by the Administration for Long March specified several conditions, each of which aims at creating a more level playing field, wit~~h prim~~ary focus today being on a set of economic conditions imposed, most likely centered around establishing a specific and limited number of Long March commercial launches per year, and establishing a fair cost based pricing for those launch services.

With appropriate agreement on such items, McDonnell Douglas would support in principle the possibility of U.S.-built satellites being launched on compatible foreign boosters as selected by launch customer.

Likewise, we would support efforts of equal vigor by our government to continue to allow U.S. launch of foreign satellites in similar circumstances.

Thank you, Mr. Chairman, and I will be happy to answer any questions.

[The prepared statement of Mr. Hood follows:]

TESTIMONY OF

ROBERT H. HOOD, JR.

VICE PRESIDENT - AEROSPACE BUSINESS DEVELOPMENT

McDONNELL DOUGLAS CORPORATION

TO

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

UNITED STATES HOUSE OF REPRESENTATIVES

SEPTEMBER 23, 1988

Thank you, Mr. Chairman, and distinguished members of the Science, Space and Technology Committee for this opportunity to testify today. First, I want to commend you and members of your Committee for the leadership you have demonstrated by the House passage of the Commercial Space Launch Act Amendments of 1988. I understand that the Senate Commerce Committee has just reported out an amended version of the bill this past Tuesday. McDonnell Douglas is encouraged by the possibility of this risk-sharing bill being enacted into law this year, prior to the launch of our first commercial payloads in March 1989.

Now let me turn my attention to the matters for discussion today. I appreciate this opportunity to express some of my views on the issue of using the Chinese Long March to launch American-built satellites. In addressing this issue, however, I believe it is essential to present an outline of the McDonnell Douglas Corporation business involvement with the People's Republic of China (PRC). Certainly, the issues involved here are broader than just launch vehicles.

McDonnell Douglas is a diverse company with a wide variety of products and customers including, among our international interests, the PRC. The Chinese are important and highly regarded customers and have been so for over a decade. I believe an understanding of this relationship is important in order to put our position on the Long March in perspective.

McDonnell Douglas Corporation first began its relationship with the PRC in 1975 with a proposal to coproduce the MD-80 series commercial aircraft - a derivative of the DC-9. After extensive internal review by the PRC, our company was invited to discuss the proposal with the PRC initially in 1978. The final agreement was signed in 1982.

The Chinese Government selected the city of Shanghai for this unique international facility. We have agreed to an exchange of personnel and procedures, and currently have about 100 Chinese engineers residing at Douglas Aircraft Company and about 40 McDonnell Douglas technical and management personnel on-site in Shanghai. The Shanghai factory has over 3,000 skilled workers and management personnel assigned to the MD-82 program.

On July 31, 1987, McDonnell Douglas and Shanghai Aviation Industrial Corporation, our PRC partner, delivered the first MD-82 aircraft assembled in the Shanghai facility. As of this month, five aircraft have been delivered -- all for use within the PRC.

I am pleased to report the program is doing well with both sides enjoying the benefit of this cooperative endeavor. This is an excellent example of how cooperation can open and enhance new markets to U. S. industry.

Another area of interest for McDonnell Douglas is in the space arena. In late 1986 John Yardley, President of McDonnell Douglas Astronautics Company, traveled to the PRC to explore potential joint space business opportunities. At that time, the Chinese expressed an interest in our propulsion stage called the Payload Assist Module (PAM) for use as a third stage on their Long March 2 expendable launch vehicle.

The PAM, a commercially-developed, shuttle-compatible upper stage had a bright future until the Challenger tragedy. When the U.S. Government policy was modified, eliminating commercial launches from the shuttle, the established market for our PAM disappeared.

We viewed the Chinese possiblity as an opportunity to establish a market for PAM in light of the shuttle policy. Subsequently, those exploratory discussions with the PRC have led to the signing of a Technical Assistance Agreement (TAA) that, in principle, gives approval by the U. S. Government for use of PAM on the Long March.

This TAA, sanctioned by the Government, stipulates that the U. S. government has the right to review each request for use of the PAM on a case-by-case basis; can only sell PAM to the satellite manufacturing companies--not directly to the PRC; that there must be no co-production with the PRC and finally, that MDC would be required to get an export license for each item of technical assistance provided.

The TAA was signed with the China Great Wall Industry Company (which markets the Long March) in October 1987. We have not sold any PAMs under this agreement to date.

Given this diverse set of relationships between MDC and the PRC, you can perhaps see why our corporation is interested in an export license for launch of U. S. satellites on the Chinese Long March.

In general, we believe that we must continue to participate vigorously in the world marketplace. And as a matter of fact, Mr. Chairman, in 1987 our international sales accounted for 25% of our total revenues. It is no longer feasible to restrict our products for U. S. use only. With the advances in communication and technology, co-production offers an opportunity to capture a greater share of international markets and thus contribute positively to the U. S. balance of trade. For example, in the joint efforts with the PRC, our revenue share on the MD-82 has contributed nearly $1 billion dollars over the last six years toward a positive trade balance.

Furthermore, by collaborating with foreign partners on projects, we believe we maintain greater influence over our business. If we withdraw entirely from the international scene, I believe we are encouraging other countries to develop industries which will surely become our competitors resulting in fewer high technology jobs for America.

It is true, too, that an additional benefit of international sales is the reduced cost of our products to the U. S. Government. The taxpayer benefits when the development costs can be spread over a larger customer base. A case in point is the McDonnell Douglas Medium Launch Vehicle. The combined government and commerical orders allow us to maintain a cost-effective production rate and a highly skilled launch team. We estimate six to eight launches are required each year to maintain a healthy business base.

Mr. Chairman, as we understand it, the proposed export license submission to the Congress by the administration for Long March launches specified several conditions, each of which aims at creating a more level playing field. First, explicit technology transfer provisions would have to be agreed to and executed. Second, the PRC would agree to sign the International Liability Convention, which would hold the U. S. harmless in the event of an accident. Third, there would be a set of economic conditions imposed, most likely centered around establishing a specific and limited number of Long March commercial launches per year, and establishing fair cost-based pricing for those launch services.

With appropriate agreement on such terms, MDC would support, in principle, the possibility of U.S.-built satellites being launched on compatible foreign boosters, as selected by the launch customer. Likewise, we would support efforts of equal vigor by our government to continue to allow U. S. launch of foreign satellites in similar circumstances.

Thank you, Mr. Chairman, for this opportunity to express the McDonnell Douglas point of view.

-end-

The CHAIRMAN. We want to thank you very much for your testimony, and I think particularly in the point that you developed a—during your—I guess it's on page 4, where you had mentioned that in 1987, and I quote, "our international sales accounted for 25 percent of our total revenues, and it is no longer feasible to restrict the products for United States use only."

Now let me ask you the question:

When we were talking before with the previous panel in reference to the fact—and again reciting the testimony of the Australians talking about, well, they'd have to reevaluate and so forth and so on, the British, without rehashing it. Then we talked about the losses that would occur to the Hughes Corporation potentially, and so forth, and then we talked about the losses that would have occurred to the launch, to the commercial launch industry people, and Dr. Lovelace had indicated that they had put in, what was it, $220 million, the figure I was, I believe, something on that order. So, therefore, there was an offset.

Now we have another unique situation that arises. Here is a United States corporation in the same field, recognizing, as the others do, that international competition is terribly important, but there's a billion dollars worth of revenue derived for a United States corporation. Now there's another billion dollars. We talked about two or three hundred million for satellites here, we're going to lose three or four hundred million here from the point of having made the investment in launch capability, but now we have a billion dollars involved. And that again is only the tip of the iceberg.

If we go back to the testimony we received earlier from the economists and so forth, that was based upon the point of view they were—the People's Republic of China is growing as a major trading partner in the Pacific area, and will continue to be so, and they won't be able to be a trading partner unless they have hard dollars to begin with, in the first place, from my point of view.

Having said all of that as a declaratory statement, I guess, then we could stand—if the People's Republic of China came back and said, hey, too bad, we'll go and we'll build our own damned airplanes, or we'll work with the French or with the Germans, which they could do, with the British, then we would be out there, too, wouldn't we?

Mr. HOOD. Yes. As you well know, we are in quite a competition with Airbus in Europe, have been for some time, and it would be my opinion that Airbus would love to get into the People's Republic of China and would probably take the opportunity to do so if we were thrown out.

The CHAIRMAN. Sure. But I mean that's altogether possible. Now if we take your particular experience and we exacerbate that over the United States improving its trading relationships with China, it paints a good economic picture between the two countries.

Mr. HOOD. Absolutely.

The CHAIRMAN. Okay. So what we're trying to get at is that—I use the phraseology "throw away the baby with the bathwater" and that came back a little bit. Okay. But we're saying to ourselves that there's got to be some other solution to our capability of being able to compete privately with private launch companies, other than cutting off our nose to spite our face. Is that a reasonable point to make?

Mr. HOOD. Yes, sir, I believe it is, and I believe one way that we need to do this is certainly take this on a case-by-case basis, and to continue to look at the pricing policies of people entering this market.

In my testimony I pointed out to you that I think we do not want to take this young industry and perturbate it and disturb it too much, and I believe Mr. Lovelace and Mr. Brackeen made that clear. Because there are benefits to the U.S. government by us launching the commercial launches.

The CHAIRMAN. Agreed.

Mr. HOOD. And if we drop below somewhere between six and eight launches a year—and that is based on the combination of government and commercial launches—it would seriously jeopardize our ability to stay in the business.

The CHAIRMAN. The gentleman from New Mexico.

Mr. LUJAN. Thank you very much, Mr. Chairman.

We are in kind of a unique position, perhaps, to be able to evaluate what fair pricing, what the level field can be all about, since you have the factory building the MD-80 in Shanghai, although it may not be quite the same. Are your labor costs substantially less there than here?

Mr. HOOD. Yes, sir. Shanghai labor costs are about one third of our U.S. labor costs. However, let me put that in the proper perspective, because in the case of the MD-80, it's about 80 percent procured from other sources of suppliers. So you have to apply that to touch labor only, and final assembly hours on MD-80 run about 50, 60,000 hours, I would guess, somewhere in that neighborhood.

Mr. LUJAN. Where is the Long March going to be built? Where do they build that rocket?

Mr. HOOD. The Long March, in China, I believe.

Mr. LUJAN. Yes, I understand that.

Mr. HOOD. And I'm not familiar with the—

Mr. LUJAN. Peking and Shanghai and Hong Kong and—

Mr. HOOD. I can't tell you that.

Mr. LUJAN. Would it be—the reason I ask you is, you know, the labor costs would be even less than your Shanghai operation in the interior of China.

Mr. HOOD. Well, I'm not sure that that has anything to do with it. At this point I think the Chinese are going to price the launch vehicle at whatever price they need to price it at to make it attractive in an introductory market. And whether it's subsidized a little or a lot, I don't think—I think is immaterial.

Mr. LUJAN. Well, it does matter in pricing. Of course, they're going to price it, you know, what the market will bear, but—

Mr. HOOD. You're asking me whether or not I can be competitive with them on an hour per hour—

Mr. LUJAN. Here.

Mr. HOOD. The answer to that is no.

Mr. LUJAN. No. And you can't be competitive in building a rocket, either, because of their labor costs?

Mr. HOOD. Correct.

Mr. LUJAN. How would—you're going to have to compete with them in the rocket business and the launching business. How would you establish fair market price? What will you charge for a launch?

Mr. HOOD. Our cost for a comparable launch of a satellite in the 4000 pound category would be about $44 million.

Mr. LUJAN. $40 million?

Mr. HOOD. About $44.

Mr. LUJAN. Okay. Say $40 million, round off the figure.

How would you say what we're trying to say to the Chinese that, you know, we want a free marketplace? Nobody wants to restrict doing business with anyone, but everybody has got to have a fair shot at it, and so therefore you must have a fair market price without subsidies and all of those things? What would you do to create that level playing field?

Mr. HOOD. Well, as I said earlier, in order to continue to make our expendable launch vehicle a viable and profitable business decision for us, we have to launch somewhere between six and eight launches per year. To the extent—and I'm sure that General Dynamics and Martin have their comparable numbers. However, they deal in a little bit different class than I do, because they deal in a heavier class of satellites, because they have that increased capability.

But if we find that the Chinese are undercutting us to the extent that we can't maintain that base, then I think we've got to take some positive actions to limit their involvement.

Mr. LUJAN. What? That's the question.

Mr. HOOD. Why?

Mr. LUJAN. What? What positive action?

Mr. HOOD. I guess simply not provide license for them to launch on a case-by-case basis U.S. satellites.

Mr. NELSON. Would the gentleman yield on that point?

Mr. LUJAN. Certainly.

Mr. NELSON. This export license is subject to a number of limitations, and one is the case in point, and I will quote:

"It has also been decided we will have an agreement to prevent possible unfair Chinese pricing or trade practices relating to launch competitions."

How do you think that that can be achieved as a part of this agreement to grant an export license?

Mr. HOOD. Well, again, Mr. Nelson, I think that to the extent—I don't know how we could ever control them providing whatever pricing arrangements they want to provide to a European satellite company. I guess that, you know, that's—they are free to do what they want there.

But to the extent that we allow export of U.S. satellites to be launched on a Chinese launch vehicle, if they continue to cut the price to the point that they get a larger percentage of the market than we can afford to have them have, and still keep a viable industry, then we just deny that export license.

Mr. NELSON. I want to follow up on that—

Mr. LUJAN. Go ahead.

Mr. NELSON. You go ahead.

Mr. LUJAN. No, I'm done. I'm done.

The **Chairman**. The gentleman from Florida is recognized.

Mr. **Nelson**. Well, if I understood what you just said, what you just said is that we have no guarantee that as a condition of this export license that we will get fair pricing from the Chinese in the future. Is that what you just said?

Mr. **Hood**. Yes, sir, I think that's probably fair.

Mr. **Nelson**. Okay.

Mr. **Hood**. Now I think that they have made some statements relative to the fact that I've heard earlier, that we expect that once they get into the marketplace, that for a good business practice, they will probably increase that price, because they will be leaving a lot of money on the table.

Mr. **Nelson**. That's right.

Mr. Chairman, that's what I've been maintaining all along, that a lot of these conditions attached to this export license are warm and fuzzies to make it sound a little better.

Now it may be a reason that for the purposes of the United States-Chinese relations, that we want to grant this export license. But let's don't kid ourselves about saying that we are going to keep in line these charges of Chinese launchers so in fact we will have an international competitive market.

There may be plenty of other reasons, Mr. Chairman, as you have demonstrated to bring out other considerations other than the development of an expendable launch vehicle commercial market here that you want to consider granting this export license. But let's don't fool ourselves when it comes around to saying that we're going to attach a condition and say that their prices are going to be competitive in the future.

I think Mr. Hood has amply stated what is in fact the truth right there.

The **Chairman**. Would the gentleman identify for the record the document he read from before, so we can include it in the record?

Mr. **Nelson**. Yes. It's the State Department Notice of Approval, September 9, 1988. It was the document that stated what the agreement was.

The **Chairman**. Okay. I thank the gentleman.

[Information referred to follows:]

Friday, September 9, 1988

CHINESE SPACE LAUNCH SERVICES

The State Department today will notify Congress and its COCOM allies of the Administration's intent to approve, subject to certain conditions, a pending export license application for the use of Chinese space launch services. The license application was submitted by Hughes Aircraft Company for the launch of two of its satellites which have been ordered by an Australian entity, AUSSAT. If this application receives final approval, including from Congress and COCOM, it will be the first ever approved by the U.S. Government for shipment of a U.S.-made satellite to a non-western destination.

The Administration has also decided to approve, subject to conditions, a license for the launch of a third U.S.-made satellite on a Chinese launch vehicle. This satellite, known as AsiaSat, will be launched on behalf of a Hong Kong-based consortium with PRC and British ownership. AsiaSat was formerly known as Westar 6. It was the satellite salvaged from orbit by the Space Shuttle during STS 51-A in November, 1984. The Congress is also being informed of the decision to approve the AsiaSat license, subject to conditions, even though the export involved is for less than the $50 million threshold for notification specified in the Arms Export Control Act. COCOM approval will also be sought.

The projected launch dates are late 1989 for the AsiaSat satellite and 1991 and 1992 for the two AUSSAT satellites.

As conditions for licensing the launches of the AUSSAT and AsiaSat satellites on Chinese expendable launch vehicles the U.S. and the PRC will establish a government-to-government regime to safeguard the technology from possible misuse or diversion and obtain a government-to-government commitment that China will accept adequate responsibility for potential liability for damages resulting from accident. It has also been decided we will have an agreement to prevent possible unfair Chinese pricing or trade practices relating to launch competitions. These agreements will be concluded before the licenses are issued.

As a matter of policy, the U.S. Government will continue its case-by-case approach to decisions on future export license requests for satellites destined for launch by the PRC. The positive outcome in these cases refects our continuing interest in expanding relations with China in ways which are mutually beneficial. We emphasize that this decision does not reflect a change in U.S. policy opposing use of Soviet launch vehicles.

In reaching this decision, the Administration is determined to protect legitimate U.S. national security interests, and assure the ability of the U.S. commercial launch industry to compete on an equal footing with launches from a non-market economy, while continuing to promote increased U.S. - China trade. In addition, the Administration reaffirms its policy of promoting and encouraging a strong U.S. commercial launch industry.

The **Chairman**. Are there any further questions for our witness? I want to thank you very much, Mr. Hood, for being with us.

Mr. **Hood**. Thank you, Mr. Chairman.

The **Chairman**. We appreciate your testimony. It's been most helpful.

Our next witness is Douglas Heydon, President of the Arianespace, Inc., Washington, D.C.

We have been talking about you half the day, so now we're glad to have you visit with us, and get a chance to rebut a little bit.

We want to welcome you, Mr. Heydon, and appreciate your being with us today. We have your testimony and it will appear in full in the record, so you can go ahead and testify as you choose.

STATEMENT OF DOUGLAS A. HEYDON, PRESIDENT, ARIANESPACE, INC., WASHINGTON, D.C.

Mr. **Heydon**. Thank you, Mr. Chairman.

I do need to say for the formal record, as my statement does, that as you know, I am representing Arianespace, S.A., and therefore in accordance with the Foreign Agent Registration Act, I have submitted all of the appropriate paperwork to the committee staff.

I think my testimony boils down, if you read it all and don't find it too boring, to the necessity to develop international rules of the road. And I think that's what an awful lot of other people have said here this afternoon. And I stress, as many people have, the international or multilateral nature of it. It's been—there have been several allusions made to the discussions between ESA and the U.S. Trade Representative's Office, with respect to the attempts to identify and codify such international rules of the road on a bilateral basis between Europe and the U.S.

It's also been noted that this has been a rather lengthy and so far not conclusive process. It actually goes back, as you know, to the initial Section 301 case that was filed in 1985 over—in 1984, rather, over four years ago, and has been going on with fits and starts since then.

I think that that activity, if expanded to include the other players as they enter—now we are talking about the PRC—there has been allusion and reference made to other possible players, and in fact, if those rules of the road are identified in a way to adequately describe this mythical level playing field, I think that most of the questions that have been answered today—asked today would be answered.

Of course, it's difficult in the case of a non-market economy to identify what are reasonable costs and so forth. But the practical fact is that if this issue of the Chinese Long March license is viewed as a trade issue, which it properly is, there are only two ways to deal with it.

One is to find some way to fit it into international ground rules, or rules of the road, or to ignore it, and as Mr. Nelson said a few moments ago, to issue it on some other basis.

I don't want to belabor the points in my testimony too far. There are some other things which have come up today that I think do deserve some attention, and I would like to spend a few moments, if I may, addressing some of those.

One of the benefits of sitting through an all-day hearing like this is that I learned some interesting things about my own company which I didn't know before.

Until Mr. Sullivan testified, for example, I was unaware that we would ever give a launch away for nothing. The controller of our company will be interested in discussing that with us, I am sure.

There has been a lot of emphasis on the discussion of ESA and the alleged subsidies. I think that all of this confusion between ESA past activities and what is and has been done in the commercial world by Arianespace as a commercial entity, which I assure you we are, ignores a couple of very important points.

Competitiveness is a relative thing. All of this discussion about competitiveness today and whether the U.S. ELV industry can be competitive is, I say, a relative thing. Let me assure you from a very personal involvement in that arena, that the U.S. ELV industry is very, very competitive, indeed, with us, and that an examination of the distribution of launch contract activity over the last couple of years, which you, Mr. Chairman, raised in one of your questions to someone earlier in the day, clearly identifies that fact.

When the Challenger accident occurred, we of course were the only active launch service provider in the free world available. So, of course, who would anybody turn to besides us? We in fact filled up the few holes in our manifest with those people who needed contracts as soon as possible.

After that, when the U.S. ELV manufacturers came on line, we were full. I think Mr. Brackeen's comments, at least his written testimony, address that point. So it is not at all surprising that the U.S. ELV manufacturers picked up some contracts which we were unable to even effectively compete for.

But where those competitions have been head to head, and there have been many of them, we have won a few and we've lost a lot. And a lot of the ones we have lost have been for non-U.S. entities. Hughes has—not Hughes, excuse me. General Dynamics has won a Eutelsat contract in direct competition with us. That's a European quasi-governmental agency, I remind the committee. Ariane has no lock on launches in Europe.

There have been, I believe, a total of 11 launch contracts won by my worthy U.S. competitors for satellites which would be launched on behalf of or by non-U.S. entities.

So I maintain that it is indeed a very competitive market, when the ground rules, the economic ground rules by which we play, are consistent, and the economic ground rules by which Arianespace and our U.S. competing ELV firms compete are indeed quite consistent. That's what all of the sound and fury that's come out of the ground rule discussions have concluded.

I think that my U.S. colleagues have acknowledged that on several occasions, and I think that it is a fair assessment.

I think another subject which has been discussed a great deal today, and perhaps put together most effectively by Dr. Lovelace in his recent comments, is this issue of will or won't European builders jump in and start using Long March and take all this business away from U.S. satellite builders.

It is my contention and my firm belief that the U.S. allies in Europe are as consistent in this regard now as they have been in the past, and in fact I believe a study of the record of the recent COCOM discussions, as Dr. Lovelace alluded, will show that the European allies have taken a fairly strong position in opposition to this activity. I have no reason to suspect that that will change.

I also have no knowledge that the British Aerospace/Matra consortium, which was one of the four bidders, the other three being U.S., as you know, in AUSSAT, took any initiative whatsoever to try to push the use of the Long March.

It is true that all four satellite bidders asked all four launch suppliers to provide a variety of options, and we did that. That is we and our U.S. competitors provided a variety of launch options to all four launch bidders. But I think it's reaching to jump to the conclusion that if the Long March license is not approved for the AUSSAT bid by Hughes, that this would automatically result in a loss of the business to the U.S.

Let me remind the committee that three of the four bidders are U.S. and two of the four launch bidders are U.S. So there is a better than 50-50 chance that on a random basis, the U.S. is going to get all the business.

I think that on the 401, I call it 401, the first Ariane 4 Promotional Pricing Issue, has also been discussed with varying degrees of accuracy today.

I would like for the record to make the following comments:

The Ariane 4 Program development was a commitment by the European Space Agency made very—a great many years ago. In fact, the beginning of the Ariane 4 Program has its roots back in the latter part of the '70s. It is not a recent decision, by any means.

The original program decision also included what is known as a demonstration flight, what we have colloquially called the 401, meaning the first flight of Ariane 4.

That flight, the 401 demonstration flight, would have gone with or without a satellite in the lower position. That position, as you know, was filled by the PanAmSat satellite, but the fact is that ESA was prepared to launch the first Ariane 4 with ballast in that position, if necessary, and I certainly don't believe that is the case for the first use of the Long March CZ-2E, which is planned for AUSSAT.

That space on the first Ariane 4 was offered to the commercial satellite world through the auspices of Arianespace, not by Arianespace, but through our commercial activities.

It was not offered by us as an introductory price, certainly, nor by ESA, but was offered because there was no other functional use for it.

It is interesting, I think, to think about the fact that PanAmSat had no other place to turn in 1985 when that decision was made. This was not a recent decision, it was made well over three years ago. And it is also interesting to note that some of the European partners in ESA have been the most adamant foes of the issuance of a separate licensing authority to PanAmSat. That is, the PPTs in Europe who participate in INTELSAT have been vigorous foes of the PanAmSat activity.

Again, there is no unanimity there.

I would also like, for clarification and your information, to add a few points about the Long March issue as it relates to INTELSAT

VII. There was some information solicited earlier which I think was somewhat incomplete.

INTELSAT has requested of the Department of State an advisory opinion on the possibility of using Long March for the INTELSAT VII series of satellites. As you probably know, Ford Aerospace was selected for the satellite provider in that case, and again this was a case where three U.S. providers and one European consortium bid, and Ford was a successful bidder in that case.

But the same situation exists there as it does for Long March. Three U.S.—pardon me—two U.S. ELV suppliers, Atlas and Titan, ourselves, and Long March, are capable of launching that class of satellite.

In anticipation of the possibility of consideration of Long March, INTELSAT has asked for that advisory opinion of the State Department. I don't know where it stands, or in fact whether State will even respond to a request for an advisory opinion. Normally the COCOM—not COCOM, but the export licensing rules do not even admit to the existence of such a thing.

The fact is that U.S. export licenses are required for the launch of any U.S. satellites by any foreign launchers, including Arianespace, and that has always been the case.

I think, Mr. Chairman, since my comments have dealt almost exclusively with the necessity for making the rules of the road on an international basis, I would like to conclude with an observation which is important to have on the record, and to be said openly.

We do not seek to exclude the Long March from the commercial launch vehicle marketplace. However, we think that its entry and participation, including with respect to these three presently proposed launches, must be on a basis by which our respective governments can ensure reasonable and fair international competition in this increasingly important marketplace.

I would be happy to answer any questions.

[The prepared statement of Mr. Heydon follows:]

STATEMENT

Before the

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

U.S. HOUSE OF REPRESENTATIVES

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

By

Douglas A. Heydon
President
Arianespace, Inc.
Washington, D.C.

The attached statement has been prepared and issued by Arianespace, Inc., Washington, D.C., which is registered with the Department of Justice, Washington, D.C. under the Foreign Agents Registration Act as an agent of Arianespace, S.A., Evry, France. This material is filed with the Department of Justice where the required registration statement is available for public inspection. Registration does not indicate approval of the contents of this statement by the United States Government.

In accordance with the requirements of Section 4.(f) of the Act, a copy of the most recent registration statement has been provided for inclusion in the records of the Committee as part of this testitimony.

Mr. Chairman:

Thank you very much for inviting Arianespace to participate in this hearing, and to offer our views on this important and complex subject. I will try to cover, in the next few minutes, some of the concerns and issues which Arianespace perceives as arising from the U.S. Government decision to issue licenses for the export of two AUSSAT and one ASIASAT satellites to be launched on the Chinese Long March launch vehicle.

First, I believe it is important to note that in recent months there has been a growing and consistent recognition of the common interests of western trading partners in the establishment of some set of "rules of the road" or guidelines for fairness in this area of activity as to governmental assistance in the furnishing of commercial launch activities. HR 4399, passed unanimously by the House of Representatives and recently reported to the full Senate by the Committee on Commerce, Science and Transportation, expresses the sense of Congress in favor of guidelines that ensure reasonable and fair international competition in commercial space activities. Indeed, as the recent Report of this Committee on HR 4399 noted:

> "Testimony provided before the Committee on the foreign launch competitive threat revealed a real need to develop a Western policy toward the use of non-western launch services. The growing trend toward "turnkey services" (i.e., procurement of a satellite delivered in orbit) reflects a truly international marketplace. U.S. policy decisions affecting commercial space activities would be substantially validated through a process involving our western friends. Unless U.S. decisions are made in an international context, U.S. launch vehicle and satellite industries may lose opportunities involving western commercial satellite competition." [1]

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[1] House Report 100-639, May 19, 1988.

The paragraph following in the Report goes on to support and encourage the development of guidelines to assure "..reasonable and fair international competition in commercial space activities". As one of the "western friends", we couldn't agree more. Unfortunately, the recent unilateral decision to approve the issue of the AUSSAT and ASIASAT export licenses at this time does not follow this sound advice.

A great deal of progress toward this objective of fair and reasonable international competition, at least so far as it affects Europe and the United States, has been made in the past four years. Many of the members of the Committee will recall the Section 301 petition filed by Transpace Carriers, Inc. in May, 1984, alleging that the European Space Agency (ESA) and Arianespace were engaging in unfair trade practices with respect to satellite launching. It is not as widely recalled that the President's determination in this matter stated as its opening remark:

> "Pursuant to Section 301(a) of the Trade Act of 1974, as amended (19 U.S.C. 2411(a)), I have determined that the practices of the Member States of the European Space Agency (ESA) and their instrumentalities with respect to the commercial satellite launching services of Arianespace, S.A. are not unreasonable and a burden or restriction on U.S. commerce."

He also stated, in the same opening paragraph, that:

> "But because of my decision to commercialize expendable launch services in the United States, and our policies with respect to manned launch services such as the Shuttle (STS), it may become appropriate for the United States to approach other interested nations to reach an international understanding on guidelines for commercial satellite launch services at some point in the future." [2]

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[2] MEMORANDUM FOR THE UNITED STATES TRADE REPRESENTATIVE, 85-17441, July 17, 1985, "Determination Under Section 301 of the Trade Act of 1974"

Europe agreed with this conclusion, and in fact had proposed during these consultations, over three years ago, that discussions be started toward such an understanding between Europe and the U.S., at that time the only two participants in the commercial launch services world. It is not unlikely that, had more progress been made in these discussions, the concerns being addressed today could have been avoided or at the least, greatly mitigated. It is our belief that the enthusiasm for these talks on the part of the U.S. has been somewhat muted; nevertheless, significant progress has been made toward a fuller understanding of the similarities between the two sides in the overall approach to the industry/government relationships in the privatizing of launch vehicle operations.

One of the important facts that has evolved from the ESA/U.S. discussions is the realization, and acknowledgement, that Arianespace is a commercial entity, operating in accordance with the same fundamental free-market principles as do our U.S. competitors. It is this fact that has both motivated the European desire to move forward with the "rules of the road" discussions, while at the same time causing us to become apprehensive about the implications of the entry into this market place of non-market-based participants.

While our respective governments took responsibility for the development phase of the U.S. and European launcher programs, each subsequently placed responsibility for the financing and furnishing of commercial launch services in the private sector, as it should be in a free-market economy. However, the entry into the commercial launch services market by non-market-based suppliers of launch services distorts the competitive nature of the market and gives rise to serious concerns on our part as to the future competitive viability of this market.

This is particularly true in the case of companies such as ours which sell their launch services entirely on a commercial basis. We do not have parallel hardware production lines under military procurement contracts to fall back upon if the commercial market is destabilized by pricing practices that appear to be very predatory in nature.

It must be kept clearly in mind that the market with which we are concerned is a small and fragile one. If this market is to survive and grow, a major objective must be to promote lower prices and the highest possible reliability and predictability. These points, as this Committee's Report notes, are crucial for the continued growth and health of our major customer market, the satellite communications field, in view of increasingly intense competition which it faces from a wide range of other technologies.

One major step made by Arianespace in this direction is the commitment to a multi-year production lot of 50 Ariane 4 launch vehicles in addition to those already in production. The success of such a plan is strongly dependent on the degree to which the assumed production and launch rate is achieved. Disruption of the market by diversion of "only" 3 or 4 launches per year is in reality a major shift of as much as 25%, since the total absolute number is small in any case. A cut-back in production rate by Arianespace of this magnitude would have a significant impact on unit production costs, to the detriment of the drive to reduce costs and promote growth. While we accept and plan for these risks in the course of fair and reasonable competition, it is exceedingly difficult, if not impossible, to do so where governments furnish services in competition with us on other than market-based principles.

Similar effects could be expected in the U.S. ELV arena. While I noted the existence of a healthy military production base in an earlier comment, the type of erosion just described in the commercial market would have an inevitable impact here as well, since the economies of scale would be affected. None of these effects would be in the "right" direction of improving the climate for the end users of these services, including the U.S. Government.

Mr. Chairman, a key phrase in your letter of invitation to participate in this discussion is "..the effects of the export approval on the long-range health of the ELV industry, and those measures that may need to be taken to maintain a competitive worldwide market place for space transportation services." It is my judgement that the long-range health of the western component of this industry will be seriously jeopardized if such approvals are granted without consideration of the impact on the viability of the western commercial launch services companies. The launch capabilities upon which much of the commercial and business success depend will be seriously eroded if non-market entrants are permitted to enter without prior demonstration of willingness and ability to abide by rules of fair and reasonable competition based on market-oriented principles.

Accordingly, we believe that any agreement with the Peoples Republic of China to prevent possible unfair Chinese pricing or trade practices relating to launch competition should be multilateral and arrived at in an international context that reflects, as this Committee has previously observed, the truly international market place for commercial launch services. We do not seek to exclude the Long March from this marketplace; however, its entry and participation, including with respect to the three presently proposed launches, must be on a basis by which our respective governments can ensure reasonable and fair international competition in this increasingly important marketplace.

Thank you, Mr. Chairman, and I will be happy to answer any questions.

The CHAIRMAN. Let me ask you, the—in an exchange of communication earlier, we noted that the comment was made that—and what is your opinion, should Europe be included in our discussions with the—on this Chinese licensing issue?

Mr. HEYDON. Are you referring to the references to the earlier ESA letter?

The CHAIRMAN. Yes.

Mr. HEYDON. Yes, I think it's fair to characterize, although I want to be careful to note that I can't speak for ESA, nor would I pretend to, but it is my belief that that letter simply recognizes or reflects a frustration on the part of those in the European Community who have been trying for many years to reach some conclusions with the U.S. on the subject of rules of the road, and level playing field, with regard to governmental assistance to the commercial sector. That is, the governments of ESA to us, and the government of the United States to the U.S. ELV competitors.

I think what that letter is trying to express is that with this background of many years of ongoing discussion, it doesn't seem appropriate to the European Community for the U.S. government to go off in this new direction unilaterally, and rapidly, without at least consultation and involvement on the part of the Europeans.

The CHAIRMAN. Let me ask one more question. Arianespace is reported as capturing about 50 percent of the world's satellite market for launch on Ariane. Do you see your market share changing as a result of China's entry into the launch services market?

Mr. HEYDON. I'm glad you asked me that. In the written text, if I may for a moment refer to page 4, I did make a point in that direction, and it is that we are dealing with what I characterize as a small and fragile market. What do I mean by fragile?

Well, I think Mr. Brackeen mentioned a number of 17 launches. All of our market studies, that is all of everybody in the business seem to be fairly consistent, that the number of launches in this coming five years or so are quite small, perhaps averaging 20 a year.

One of the things that disturbs us is that repeated references to one possible solution to this dilemma being the agreement to allow the PRC to take "only three or four" launches should be put in the context that that could represent 20 or 25 percent of the available market.

That is not an insignificant disruption, and as I noted in my comments, plans such as ours for a multi-year continuous production of 50 Ariane 4 vehicles over the next decade might be called into serious review. That is, we certainly have to review the production and launch rate, which would have negative consequences on the—our attempts to reduce costs for the overall benefit of the community. I think the same thing is very likely true for my American colleagues, and I think in different—in a different way that's what they were saying this afternoon.

The CHAIRMAN. Well, in any case, is there room for this many launch companies, both European and American? I mean is there too many people in the business?

Mr. HEYDON. Well, that is certainly a valid question, and I think one of the things that you have heard said several times today by different people and in different ways is that the market can certainly determine that, and should be allowed to determine it, if in fact the market is being treated in a consistent way. And we certainly are willing to take our risks. We have made those decisions as far as committing to the 50 launch production lot, but we have made them on the basis of the assumption that we can compete as we have been with our U.S. competitors, on a fairly even footing, and that we will win some and lose some, as we have in the past, but that on balance we will be able to keep enough to fill up that production over the 10 years.

I think that if there is—if there are other entries in the marketplace, and they compete on the same basic footing that we do, we are willing to take our chances. Some will win and some will lose.

I would like to also point out that we do not have anything other than our commercial business to fall back on; that is, there is no equivalent MLV production in Europe, for example, so we are very heavily dependent upon the commercial market, totally dependent on the commercial market, and therefore we feel that this is essential that it be tried—that it be put on an even footing.

The CHAIRMAN. Let me ask one more question. Does the consumer benefit if I am going to launch a satellite to do a thing, whatever it happens to be, telecommunication, television, and I'm launching it for $60 million less than the next bidder can do it for, or thereabouts? Am I giving a better break to my consumer at that point, the recipient of the services?

Mr. HEYDON. I think there are obvious short term and long term considerations in that type of a discussion, and I think what we are really—many of us are dealing with today is more the long term conclusion than the short term.

Clearly if behind your question is the body of information you have heard today regarding the price differential to AUSSAT, the AUSSAT consumers will clearly benefit, near term and directly, from a lower Long March price.

The long term considerations include such things as the continued viability of the Western launch suppliers, and that is the longer term issue that many of your committee members and others have brought up today in many different guises.

There is not a simple answer to it, obviously, because it's a multifaceted question.

The CHAIRMAN. The gentleman from New Mexico, Mr. Lujan.

Mr. LUJAN. Well, you know, we've been kind of through this before with Ariane being in—getting into the business, how we are going to assure a level playing field with a government entity, almost. I know you say that there's no subsidy or anything. But it's no different now than it was at that time. Our concern is that Long March will just place its prices—and I'm sure you're concerned also—just five to ten million dollars below what you would charge and what our companies would charge, and take a big chunk of the business that way.

Did we have any kind of—when export licenses were granted for U.S. satellites to be launched on Ariane, was there ever any kind of an agreement that was entered into that said that there would be a level playing field?

Mr. HEYDON. No. And I think it's interesting that you should put it in that context, because if you'll think back to the time when

Ariane entered the commercial satellite launching market, which was in the early '80s, the only competition was U.S. Shuttle.

It's our view that the tilt on the playing field was toward the U.S., because the Shuttle certainly has not been pricing commercial satellite launches on a market-based price in the past. And, in fact, that was one of our primary concerns in the days when the Shuttle was the total competition we had.

I don't, with all respect, Mr. Lujan, accept your assertion that we acted in the same way. Because the fact is that in those early days, and I think if you look at the numbers, you will find that this is entirely consistent—when we were competing with the Shuttle, there were several factors which were very helpful in allowing us to do that without losing our shirts.

One is a very strong dollar; back in early 1985, for example, the U.S. dollar, relative to the French franc, which is our primary exchange currency, was peaked as high as 10.2. At that time we priced the standard launch for PAM-D—everybody talks about a PAM-D class launch, because it's something we all relate to—we priced it at the number of francs and Deutschemarks and all the other currencies that are built into our operating structure, at a number that converted to somewhere around $22.5 or $23 million U.S. dollars.

That same launch, at that same price today—I haven't checked the exchange rates today—but it's somewhere in the high 30s. It has been recently as high as $45 million for that same launch, depending entirely upon the relative strength of the U.S. dollar to the basket of European currencies with which we deal.

That fortuitous circumstance in the early '80s of a strong U.S. dollar and high U.S. interest rates relative to European interest rates, allowed us to offer some business deals which were attractive, but without those fortuitous circumstances, we would have been hard-pressed indeed to compete with the Shuttle.

It's become hard for us to compete with the U.S. suppliers in the market, when the U.S. dollar sank to a low of about 5.5 francs, which it did for a short time. I'd love to see the dollar go back to eight francs and make my life easy, but it isn't going to happen, I don't think.

I think that you have to put the thought behind the kind of question you just asked in the context of the economic realities of the time in which they occurred, and that has been a very dynamic arena in the last four or five years, as you know.

Mr. LUJAN. Well, there's no question that, you know, we were underpricing the Shuttle. I don't think anybody would deny it; at least that's my point of view, that we weren't getting all that we should have for those flights. But then it's always been my thought, anyway, you can say that that's incorrect, that the pricing was just low enough so that you could get the business on Ariane, and when the Shuttle went down, you raised the prices. I'm not arguing with you, the whole—

Mr. HEYDON. Do you know how many U.S. companies were contracted with Ariane before the Shuttle disaster?

Mr. LUJAN. No, I don't know how many.

Mr. HEYDON. Two.

Mr. LUJAN. Two?

Mr. HEYDON. We had two U.S. customers prior to the Shuttle disaster. We did not have a significant fraction of the U.S. market at all. GTE Spacenet and SBS, that is the SBS-V Satellite, now owned and incidentally launched successfully a couple of weeks ago by STLC of IBM, but at that time the SBS Corporation, which was a partnership between IBM and MCI. Those are the only two U.S. customers we had prior to the Shuttle disaster.

We have never had a very easy job penetrating the U.S. market. The big success, worldwide, that Ariane has had has been heavily based in Europe, with some obviously in third world nations such as Brazil and the like, but we have had a difficult time competing anywhere else, because of this past history.

Mr. LUJAN. Do you think that if British Aerospace/Matra would have gotten the contract, that Great Britain would have given a license to launch with Long March? What's your speculation?

Mr. HEYDON. Well, it's purely speculation, but based on what I know of the bidding process, I will say I think not, and my reasoning is that the AUSSAT bidding package, as it was originally received through the satellite builders to the launch service supplier such as ourselves, was extremely heavily weighted toward avoidance of risk, and AUSSAT, initially at least, seemed prepared to pay a significant premium price to shift the risk to other people.

In fact, as part of the whole scenario, one of the issues, one of the subjects which wasn't brought out today, is that during the refinement of the tender offer that was referred to earlier, we and I believe all of the U.S. launch vehicle suppliers involved—that is, only two, Martin and GD—were asked if specifically we would provide a back-up to a Long March launch. That is, if Long March was chosen as the primary launcher, would we provide a back-up capability and, as it were, stand in the wings and pick up any slack if there was any problem with this as yet undeveloped launcher.

And we all said no, that we didn't see any business advantage to us to helping somebody else get into the business, and I believe that my U.S. competitive colleagues said much the same thing. And the reasoning was very simple: That we have all, through a torturous and painful and sometimes failure-ridden process, gotten ourselves to varying degrees of availability and reliability and dependability, all those things being very important to the end user, and we felt that that was worth something, and we didn't want to give that up as a back-up to a new entrant.

Mr. LUJAN. Thank you very much, Mr. Chairman.

The CHAIRMAN. We want to thank you very much for your testimony. It's excellent, and we appreciate your being with us and taking the time today.

We have one more witness this afternoon, Dr. David R. Scott, President of Scott Science & Technology from Palmdale, California.

Dr. Scott, welcome. We'd appreciate your summarizing your statement, because I think that is going to be most effective, but your statement will appear in full, of course, in the record.

STATEMENT OF DAVID R. SCOTT, PRESIDENT, SCOTT SCIENCE AND TECHNOLOGY, INC., PALMDALE, CALIFORNIA.

Mr. Scott. Thank you, Mr. Chairman. It gives me great pleasure this afternoon to have the opportunity to address this distinguished committee.

I am president of Scott Science and Technology, Inc., a U.S. public company engaged in the business of commercial space transportation. And in this particular business, we are involved in the design and development of an upper stage or transfer vehicle, as well as the turnkey or on-orbit delivery of satellites.

At the present time we have been engaged in the evaluation of various launch vehicles and satellite opportunities, and we have recently signed a letter of intent with Dominion Video Satellite, a direct broadcast satellite company, for the on-orbit delivery of three direct broadcast satellites. Subject to Dominion receiving their final financing, our company will receive two of these satellites, which have already been constructed from the General Electric Corporation, and deliver them on orbit in the fall of '89, in the spring of 1990.

At the present time we plan to use the Chinese Long March III for these deliveries.

Let me briefly talk a little bit about our business and how it operates.

As you have seen today in the discussions, the trend in satellite procurement is now for on-orbit delivery. We recognized this several years ago when we began the design and development of our upper stage, which is called the satellite transfer vehicle.

We initially based the design on the Shuttle as it was to be a commercial upper stage for the Space Shuttle. Unfortunately, when we lost the Challenger, space policy was changed, and our business had to be redirected because of the lack of shuttle commercial launches.

During that redirection, we learned quite a bit, as I am sure many other companies in the industry did. The reassessment after Challenger was very enlightening throughout the world.

In that process, we found that the best way to buy a satellite is to buy it on orbit, and we found that most communications companies in the world preferred that method of procurement, in that communications companies are not normally schooled in the art, if you will, of launch and transfer and rocket ships. They are communications people, and they would like to have their transponders available in orbit, and they really don't like getting into this mysterious black art of rocket ships which often fail.

So you have seen this evolution over the past few years with British Satellite Broadcasting, AUSSAT and INTELSAT, and I believe we are going to see it in future years to come.

The key to the price or the cost of on-orbit delivery is the integration of the total system, as Congressman Nelson spoke this morning. Systems integration is the key; that is, you must take the elements of delivery and you must integrate them and make proper tradeoffs so as to minimize costs and maximize revenue or on-orbit lifetime.

This is the approach that we have attempted to take, and with our satellite transfer vehicle upper stage, we have designed that to be compatible with not only the Shuttle, but other expendable launch vehicles such as the Titan and the Long March.

Now the upper stage is actually the connectivity or the linkage between the satellite and the launch vehicle, and if properly designed, you can reduce the cost of delivery significantly.

As an example, if the satellite transfer vehicle were used with the Titan 4, the Air Force Titan 4, with large government satellites, we could reduce the cost of delivery to geosynchronous orbit by about 25 percent.

With a commercial launch vehicle, such as the Titan 3 or the new Long March 2E, using such an upper stage, we can reduce the cost of delivery—and this is per pound of payload—we can reduce the cost of delivery to a geosynchronous transfer orbit by on the order of 40 percent. And it is the optimization of the system that really counts.

So we have spent a great deal of time looking at launch vehicles, and I believe that this country can clearly compete in the worldwide market for on-orbit delivery. We have super launch vehicles. If we integrate them properly. And if we don't look to the future and consider this total turnkey process, I believe our country will fall behind.

Now as a public company, we also have a responsibility to our stockholders and we have taken a close look at our business, and we think that in the near term, by using the Long March series of launch vehicles, we can not only save our customers considerable money, but we can also reap substantial profits at fair prices. The Long March is the example, and we have done a preliminary evaluation of Long March.

I have personally been to China two times. I have viewed the Long March vehicles in final assembly two times, and I have taken our technical team leader to China, a gentleman who used to be the chief engineer on the shuttle orbiter.

Our conclusion is that the Chinese Long March series are basically what was known in the '70s as a big dumb booster concept. A very simple launch vehicle, to deliver a satellite or a payload into low earth orbit, to get it through the atmosphere, which is a very critical phase, but once it's in space, you then refine your trajectory to deliver the satellite to its final operational orbit.

In the early 1970s, there was a lot of discussion in our country about big dumb boosters versus shuttles. I think we chose the path in our country of developing the Shuttle, which I think at the time was the correct path, but at the same time we should continue to look at this big dumb booster concept, because the Chinese have, in our opinion, and one reason for the prices that the Chinese are able to offer is the fact that their launch vehicles are very simple and very inexpensive, very straightforward.

And I'll give you a couple of quick examples. In a quantitative sense, if we were to apply the techniques of our upper stage to delivering a satellite from low earth orbit to transfer orbit, and compare that with the inertial upper stage built by Boeing for the Air Force, the cost reduction could be such that an analogy with a Titan 3 and a Long March would lead us to a conclusion that the

Long March should be ~~about~~ $15 million per launch. You can make those kinds of reductions in cost if you do it right.

Qualitatively, if you look at the Long March in the manner in which it's produced you find that not only is the configuration very simple, but the process by which they build the vehicle and check it out is very simple.

As an example, in the configuration of the new Long March 2E, which is being developed, and they intend to launch the first vehicle in October of '90, it has eight basic liquid rocket engines on the first stage, and the same engine on the second stage.

If you compare that with the Titan, the Titan has three different engines, and the Ariane has four different engines. But when you have the complexity of the Western-built launch vehicles, you have many interfaces, many subcontractors, in a very difficult configuration management process. The Chinese have one manufacturer, one team, one very simple configuration control process.

So they have the benefit of the simplicity in terms of their cost, and we can see why a Long March, because of its design and because of the many other aspects of producing such a launch vehicle, we can see why that would be substantially less than its Western counterparts.

On the other hand, the Titan and the Atlas and the Delta and Ariane—I guess I should focus on the three U.S. ELVs, they were built for different purposes. They were designed for purposes which weren't commercial spacecraft delivery and, therefore, they have some attributes which are not necessary for a simple delivery to low earth orbit, as an example, with the Titan.

And if the commercial customer has to pay that, he's going to pay more money, and that hurts the competitive aspects in the business.

So, in summary—and I'll be glad to answer questions and you have my written testimony—but in summary, I believe that as a country we can compete. Our little company is looking at the market from a turnkey delivery point of view, and if we are successful in obtaining contracts, we will make a fair amount of money for our shareholders. We buy launch vehicles, we don't necessarily sell them, but we sell a package.

We think that by looking at the total integration of the system—and that includes other elements of delivering launch vehicles, such as the satellites and launch sites and launch insurance—if you look at that as a package and you optimize a package, you can be very competitive in the market.

As a matter of fact, we can put a satellite transfer vehicle on a Titan 3, the last one in the line on a year, because that should be the least expensive, and the price per pound of payload to low earth orbit will be comparable to that, the best price the Chinese offer at the present time.

So the bottom line is how do we compete in the international arena? I believe we can compete, but we have to focus our efforts and understand what the competition is, and basically integrate the system.

Again I appreciate the opportunity of addressing the committee, and I would be glad to respond to any questions you may have.

[The prepared statement of Mr. Scott follows:]

STATEMENT

OF

DAVID R. SCOTT
PRESIDENT
SCOTT SCIENCE AND TECHNOLOGY, INC.
PALMDALE, CALIFORNIA

BEFORE THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C.

SEPTEMBER 23, 1988

MR. CHAIRMAN, COMMITTEE MEMBERS AND GUESTS, IT IS A PRIVILEGE TO APPEAR BEFORE THIS DISTINGUISHED COMMITTEE TODAY TO PROVIDE THE VIEWPOINT OF SCOTT SCIENCE AND TECHNOLOGY, INC. (SST), A PUBLIC COMPANY ENGAGED IN THE BUSINESS OF COMMERCIAL SPACE TRANSPORTATION TO INCLUDE THE DESIGN, DEVELOPMENT, AND PRODUCTION OF A COMMERCIAL LAUNCH VEHICLE FOR MEDIUM AND LARGE CONTEMPORARY SATELLITES.

SST APPRECIATES THE OPPORTUNITY TO DESCRIBE ITS BUSINESS OBJECTIVES AND OPPORTUNITIES WHICH INCLUDE THE POTENTIAL USE OF THE CHINESE LONG MARCH SERIES OF LAUNCH VEHICLES. THE USE OF SUCH LONG MARCH VEHICLES IS ANTICIPATED TO RESULT IN SIGNIFICANT PROFITS TO SST, AND CONSEQUENTLY DIVIDENDS TO ITS SHAREHOLDERS, DURING THE NEXT TWO FISCAL YEARS, AND THEREAFTER.

IN THIS REGARD, SST HAS RECENTLY SIGNED A LETTER OF INTENT WITH DOMINION VIDEO SATELLITE, INC. (DOMINION) FOR THE LAUNCH AND ON ORBIT DELIVERY OF UP TO THREE DIRECT BROADCAST SATELLITES, THE FIRST OF WHICH IS SCHEDULED FOR LAUNCH IN AUGUST 1989. SUBJECT TO DOMINION RECEIVING ITS FINAL FINANCING, SST WILL RECEIVE THESE SATELLITES FROM THE GENERAL ELECTRIC COMPANY AND SUBSEQUENTLY DELIVER THEM TO DOMINION ON ORBIT FULLY CHECKED OUT. IT IS ABSOLUTELY ESSENTIAL TO THE SUCCESS OF THE DOMINION BUSINESS

PLAN THAT THE FIRST OF THESE DIRECT BROADCAST SATELLITES BE DELIVERED ON ORBIT BEFORE THE END OF 1989. THE SECOND SATELLITE IS SCHEDULED FOR DELIVERY BY SST BEFORE MID-1990. BOTH SATELLITES HAVE ALREADY BEEN CONSTRUCTED AND GROUND TESTED BY GE.

IT SHOULD BE NOTED THAT THE ONLY LAUNCH VEHICLE AVAILABLE WORLDWIDE TO MEET THIS SCHEDULE REQUIRED BY DOMINION IS THE CHINESE LONG MARCH.

DOMINION IS AMONG THE MANY SATELLITE OWNERS/ OPERATORS, BOTH DOMESTICALLY AND INTERNATIONALLY, WHO HAVE CONCLUDED, SINCE THE LAUNCH VEHICLE LOSSES OF 1986, THAT ON ORBIT PROCUREMENT OF SATELLITES IS FAR MORE DESIRABLE FOR COMMUNICATIONS COMPANIES THAN THE COMPLEX, AND TO THOSE NOT "SCHOOLED IN THE ART," DISCIPLINES IN WHICH COMMUNICATIONS COMPANIES DO NOT NECESSARILY HAVE PROPER EXPERTISE.

INTERNATIONALLY, THE THREE MOST RECENT SATELLITE PROCUREMENTS HAVE REQUESTED PROPOSALS FROM THE INDUSTRY FOR ON ORBIT DELIVERY OF THEIR NEW SATELLITES (BSB, AUSSAT, AND INTELSAT). THIS PROCUREMENT PROCESS IS BECOMING STANDARD PROCEDURE. THE U.S. GOVERNMENT IS EVEN SLOWLY MOVING IN THIS DIRECTION, WITH THE RECENT POLICY SHIFT OF LAUNCH SERVICE PROCUREMENT RATHER THAN LAUNCH VEHICLE PROCUREMENT. SUBSTANTIAL

COST SAVINGS AND OTHER EFFICIENCIES CAN BE REALIZED FROM SUCH A PROCESS.

IF ALL THE ELEMENTS OF SUCH AN ON ORBIT SATELLITE DELIVERY (E.G., SATELLITE, LAUNCH, INSURANCE, ETC.), ARE PROPERLY INTEGRATED AND OPTIMIZED, SUBSTANTIAL OVERALL COST AND PERFORMANCE BENEFITS CAN BE REALIZED (ACCRUED). THIS PROCESS OF SYSTEMS INTEGRATION TO DELIVER ESSENTIALLY A "PACKAGE" OF ELEMENTS IS OFTEN CALLED A "TURNKEY" SERVICE. THE OIL INDUSTRY THRIVES ON SUCH "TURNKEY" SERVICES FOR EXPLORATORY AND PRODUCTION OIL WELLS.

OVER TWO YEARS AGO, AND IN ASSOCIATION WITH CERTAIN PROMINENT INDIVIDUALS FROM THE OIL INDUSTRY, SST REDIRECTED ITS BUSINESS OBJECTIVES TO APPLY SUCH A TURNKEY CONCEPT TO THE COMMERCIAL SPACE TRANSPORTATION BUSINESS ELEMENTS IN WHICH IT WAS ALREADY ENGAGED. THIS SST TURNKEY SATELLITE DELIVERY PROCESS HAS NOW BEEN REFINED TO THE POINT WHEREBY EVEN FOR LARGE U.S. GOVERNMENT SATELLITES USING U.S. GOVERNMENT-STANDARD LAUNCH VEHICLES (TO INCLUDE AN SST-DESIGNED UPPER STAGE) THE COST OF SATELLITE DELIVERY TO GEOSYNCHRONOUS ORBIT (GEO) COULD BE REDUCED AS MUCH AS 25 PERCENT. THIS WOULD BE A REDUCTION FROM APPROXIMATELY $15,000 PER POUND OF PAYLOAD (FOR A TITAN 4) TO APPROXIMATELY $11,000 PER POUND OF PAYLOAD (FOR AN SST-TITAN 4).

EVEN GREATER SAVINGS CAN BE REALIZED FOR COMMERCIAL SPACE TRANSPORTATION.

THREE TURNKEY ELEMENTS IN PARTICULAR ENABLE SST TO OFFER SUCH COST SAVINGS AND PERFORMANCE GAINS AT PRESENT -- THE LAUNCH VEHICLE, THE TRANSFER VEHICLE (OR "UPPER STAGE"), AND THE INTEGRATION OF THE TWO. SST IS CURRENTLY ADDRESSING OTHER TURNKEY ELEMENTS (SUCH AS THE SATELLITE AND THE LAUNCH SITE) WHICH, WHEN PROPERLY INTEGRATED AND OPTIMIZED, SHOULD OFFER EVEN FURTHER GAINS.

IT IS ESSENTIAL TO UNDERSTAND THIS SST TURNKEY PROCESS IN ORDER TO APPRECIATE THE BUSINESS POTENTIAL AVAILABLE TO SST FROM THE INCORPORATION OF THE LONG MARCH AS AN OPTION WITHIN THE SST TURNKEY CONCEPT.

FIRST, CONSIDER THE TRANSFER VEHICLE. REMEMBER THAT TO OPTIMIZE THE SATELLITE DELIVERY, THE TRANSFER VEHICLE CANNOT BE DESIGNED IN ISOLATION FROM THE OTHER ELEMENTS, ESPECIALLY SINCE THE TRANSFER VEHICLE IS THE "CONNECTIVITY" BETWEEN THE LAUNCH VEHICLE AND THE SATELLITE. FIVE YEARS AGO SST INITIATED THIS DESIGN APPROACH FOR A COMMERCIAL SHUTTLE OPTIMIZED TRANSFER VEHICLE AT NASA'S REQUEST. AN SST-DESIGNED TRANSFER VEHICLE, THE "SATELLITE TRANSFER VEHICLE" (STV), HAS NOW BEEN REFINED TO BE

COMPATIBLE WITH THE MAJOR LAUNCH VEHICLES OF THE WESTERN WORLD. THESE ARE THE TITAN 3 AND 4, THE ARIANE 5, THE LONG MARCH 2E, AND, OF COURSE, THE SHUTTLE.

THE LAUNCH VEHICLE WAS THE SECOND ELEMENT TO BE ADDRESSED BY SST IN ITS TURNKEY APPROACH. MANY LAUNCH VEHICLES HAVE NO INDIGENOUS UPPER STAGE (OR TRANSFER VEHICLE); E.G., THE TITAN SERIES, THE SHUTTLE, AND THE LONG MARCH 2-E. SUCH LAUNCH VEHICLES ARE NATURALLY IDEAL TECHNICAL AND BUSINESS OPPORTUNITIES FOR SST AND THE STV, AND HENCE THE TURNKEY CONCEPT. AS AN EXAMPLE, THE COST PER POUND OF PAYLOAD DELIVERED FROM EARTH TO GEOSYNCHRONOUS TRANSFER ORBIT (GTO) BY A COMMERCIAL LAUNCH SYSTEM CAN BE REDUCED BY AS MUCH AS 40 PERCENT. THIS WOULD BE A REDUCTION FROM APPROXIMATELY $15,000 PER POUND TO APPROXIMATELY $8,500 PER POUND.

DUE TO THE VERSATILITY AND CAPABILITY OF THE STV, EVEN FURTHER COST SAVINGS TO THE CUSTOMER AND PROFIT GAINS TO SST CAN BE REALIZED FROM THE USE OF A "BIG DUMB BOOSTER," A CONCEPT STRONGLY ADVOCATED IN THE U.S. DURING THE EARLY 70'S AS A SUPPLEMENT OR SUBSTITUTE TO THE SHUTTLE. THE BIG DUMB BOOSTER IS A SIMPLE, LOW COST LAUNCH VEHICLE DESIGNED TO DELIVER PAYLOADS TO LOW EARTH ORBIT (LEO) WITH AS LITTLE SOPHISTICATION, AND AS HIGH A RELIABILITY AS POSSIBLE. DELIVERY TO A PRECISE ORBITAL POSITION IS

NOT A PRIMARY OBJECTIVE, LOW COST IS! THE RESULT IS MORE PROFITS TO THE SHAREHOLDERS.

BECAUSE OF ITS CONFIGURATION, THE SATELLITE TRANSFER VEHICLE, UNLIKE OTHER UPPER STAGES, OFFERS EVEN FURTHER OPTIMIZATION IN THE INTEGRATION OF THE BIG DUMB BOOSTER INTO THE TURNKEY CONCEPT. THIS INTEGRATION IS THE THIRD TURNKEY ELEMENT WHICH WILL ENABLE SST TO OFFER ADDITIONAL COST SAVINGS TO ITS POTENTIAL CUSTOMERS. THE STV OPERATIONAL CONCEPT ENABLES GROUND TRACKING TO BE INTEGRATED INTO THE LAUNCH AND TRANSFER SUCH THAT THE ACCURACY OF SATELLITE INSERTION INTO ITS FINAL ORBIT IS ESSENTIALLY EQUIVALENT TO THE ACCURACY OF GROUND TRACKING. AFTER LAUNCH TO LOW EARTH ORBIT, THE STV MAKES MULTIPLE PRECISION MANEUVERS IN TRANSFERRING THE SATELLITE TO GEO OR GTO, GROUND TRACKING AND GUIDANCE UPDATES ARE PERFORMED BETWEEN EACH MANEUVER.

THE NEXT ELEMENT TO BE ADDRESSED BY SST TO BE INTEGRATED INTO THE TURNKEY CONCEPT IS THE SATELLITE ITSELF (THE LAUNCH SITE IS TO FOLLOW). IN SEPTEMBER 1987, SEVEN U.S. DOMESTIC COMMUNICATIONS COMPANIES FILED APPLICATIONS WITH THE FEDERAL COMMUNICATIONS COMMISSION (FCC) TO OBTAIN PERMITS FOR THE CONSTRUCTION, LAUNCH, AND OPERATION OF A NEW GENERATION OF U.S. DOMESTIC COMMUNICATIONS SATELLITES, ALMOST TWICE AS LARGE AS THOSE PRESENTLY ON ORBIT. BECAUSE OF THE ADVANTAGES OF THE SST TURNKEY

SERVICE AS WELL AS THE TREND OF THE SATELLITE OPERATORS TO REQUEST ON ORBIT DELIVERY, SST INTENDS TO RESPOND TO THE REQUESTS FOR PROPOSALS FROM THESE SEVEN COMPANIES. SST HAS RECENTLY HAD DISCUSSIONS WITH TWO MAJOR SATELLITE MANUFACTURERS RELATIVE TO THE INCORPORATION OF THEIR SATELLITE DESIGN INTO THE SST TURNKEY PROPOSALS.

AS A RESULT OF THE INTEGRATION OF THE PROPER SATELLITE DESIGN INTO THE SST TURNKEY CONCEPT UTILIZING THE SATELLITE TRANSFER VEHICLE (TO BE MANUFACTURED BY TRW, INC. IN ACCORDANCE WITH PRIOR AGREEMENTS), AND IF A "BIG DUMB BOOSTER" SUCH AS THE CHINESE LONG MARCH 2E IS AVAILABLE TO SST, SST WILL THEN BE ABLE TO OFFER ON ORBIT SATELLITE DELIVERY TO THESE SEVEN POTENTIAL CUSTOMERS AT SUBSTANTIAL COST SAVINGS OVER COMPETITIVE CONCEPTS. ADDITIONALLY, THIS TURNKEY SYSTEMS INTEGRATION WILL MOST LIKELY PROVIDE LARGER COMMUNICATIONS PACKAGES AND LONGER SATELLITE LIFETIMES TO THE SATELLITE OWNER/ OPERATORS.

A MAJOR ELEMENT TO BE INTEGRATED IN THE SST TURNKEY PROPOSALS, ESPECIALLY TO PROVIDE COST SAVINGS, IS THE BIG DUMB BOOSTER CONCEPT, AS MANIFESTED BY THE LONG MARCH 2E/SATELLITE TRANSFER VEHICLE COMBINATION. NOT ONLY WILL A U.S. PUBLIC COMPANY AND ITS STOCKHOLDERS BENEFIT FROM THIS CONFIGURATION, BUT ALSO THE U.S. DOMESTIC FIXED SATELLITE SERVICE WILL OPEN A NEW ERA OF

SATELLITE COMMUNICATIONS WITH SUBSTANTIALLY LESS FRONT END INVESTMENT. THE MARKET WILL ENSURE THAT THE ULTIMATE BENEFICIARY OF THE SAVINGS AND LOWER COST WILL BE THE U.S. PUBLIC. THEY WILL RECEIVE MUCH-NEEDED SERVICES AT MORE REASONABLE PRICES.

THE COMMERCIAL TITAN 3 IS A DERIVATIVE OF THE GOVERNMENT-DEVELOPED TITAN SERIES OF MILITARY BOOSTERS DESIGNED TO DELIVER PAYLOADS (31,500 POUNDS) TO LOW EARTH ORBIT (LEO) ONLY. THE TITAN HAS NO INDIGENOUS UPPER STAGE TO DELIVER, E.G., COMMUNICATIONS SATELLITES TO GEOSYNCHRONOUS ORBIT (GEO). SIMILARLY, THE LONG MARCH 2E IS A DERIVATIVE OF A GOVERNMENT-DEVELOPED BOOSTER DESIGNED TO DELIVER PAYLOADS (19,800 POUNDS) TO LEO ONLY HAVING NO INDIGENOUS UPPER STAGE. AS ONE APPROACH TO AN ASSESSMENT OF COMPETITIVENESS, THE FOLLOWING DISCUSSIONS PRESENTS A BRIEF COMPARISON OF THESE TWO ELV'S RELATIVE TO COST, CONFIGURATION, AND SEVERAL PROGRAMMATIC ISSUES.

SPECIFIC CHARACTERISTICS OF THE TITAN AND THE LONG MARCH ARE EVALUATED HEREIN QUANTITATIVELY AND QUALITATIVELY. SUPPORTING DETAILS ARE AVAILABLE ON REQUEST. THE BASIC PREMISE FOR THE EVALUATION IS THE RELATIVE COSTS OF PRODUCING SIMPLE YET EFFECTIVE LAUNCH VEHICLES AS OPPOSED TO COMPLEX AND, CONSEQUENTLY, EXPENSIVE LAUNCH VEHICLES. THE LONG MARCH IS IN THE FORMER CATEGORY; U.S. ELVS AND THE ARIANE ARE IN THE LATTER, ALL OF WHICH

WERE DESIGNED TO PERFORM ESSENTIALLY THE SAME MISSION.

QUANTITATIVELY, AND TO ESTABLISH A BASELINE, A COST/PERFORMANCE COMPARISON CAN BE MADE BETWEEN TWO OTHER U.S. LAUNCH VEHICLES, ONE EXPENSIVE, ONE INEXPENSIVE, AND THE RESULTS EXTRAPOLATED TO A COMPARISON OF THE TITAN WITH THE LONG MARCH.

1. THE INERTIAL UPPER STAGE (IUS) IS A COMPLEX, SINGLE PURPOSE LAUNCH VEHICLE (UPPER STAGE) MANUFACTURED BY BOEING FOR THE U.S. AIR FORCE. THE IUS COSTS $47 MILLION AND WILL DELIVER SLIGHTLY OVER 5,000 POUNDS FROM LOW EARTH ORBIT (LEO) TO GEOSYNCHRONOUS ORBIT (GEO). (NOTE: AN "UPPER STAGE" SUCH AS THE IUS OR THE STV, IS CATEGORIZED BY THE U.S. GOVERNMENT AS A "LAUNCH VEHICLE.")

2. THE SATELLITE TRANSFER VEHICLE (STV) IS A LOW COST, HIGH PERFORMANCE, RELATIVELY SIMPLE LAUNCH VEHICLE (UPPER STAGE) WHICH WHEN MANUFACTURED BY TRW, INC., EVEN TO GOVERNMENT STANDARDS, WILL COST ONLY $23 MILLION. THE STV CAN DELIVER OVER 10,000 POUNDS FROM LEO TO GEO. (THIS COST AND PERFORMANCE HAS BEEN VERIFIED BY FIVE MAJOR AEROSPACE COMPANIES, FOUR OF WHICH WERE CONTRACTED BY THE USAF TO DESIGN THE ADAPTABLE SPACE PROPULSION SYSTEM (ASPS), AN EQUIVALENT TO THE STV.)

3. THE COST PER POUND FOR EACH OF THESE VEHICLES TO DELIVER A PAYLOAD FROM LEO TO GEO ENABLES A COMPARISON TO BE MADE BETWEEN A SIMPLE AND A COMPLEX LAUNCH VEHICLE OF THE SAME CLASS:

	IUS	STV	DIFFERENCE
COST/POUND	$9,400	$2,300	76 PERCENT

4. A SIMILAR COMPARISON OF TITAN 3 AND THE LONG MARCH 2E CAN BE MADE FOR THE DELIVERY OF A PAYLOAD FROM EARTH TO LEO. THE TITAN 3 DELIVERS 31,500 POUNDS TO LEO AT A COST OF $100 MILLION PER VEHICLE, OR $3,175 PER POUND OF PAYLOAD. USING THE DIFFERENCE BETWEEN THE IUS AND THE STV, 76 PERCENT, AS AN ANALOGY, THE COST PER POUND OF PAYLOAD DELIVERED FROM EARTH TO LEO BY THE LONG MARCH 2E SHOULD BE $762 PER POUND. OR, BASED ON THE PUBLISHED LONG MARCH 2E PERFORMANCE OF 19,800 POUNDS FROM EARTH TO LEO, THE LONG MARCH 2E SHOULD COST $15 MILLION PER LAUNCH.

QUALITATIVELY THERE ARE MANY REASONS FOR THE LONG MARCH TO BE SUBSTANTIALLY LESS IN COST (PRICE) THAN ANY OF THE REMAINING FOUR AVAILABLE COMMERCIAL LAUNCH VEHICLES (EXCLUDING THE PROTON). AMONG THE MORE INTERESTING, THE FOLLOWING ARE SUMMARIZED:

QUALITY	U.S. ELVS AND ARIANE	LONG MARCH
CONFIGURATION	COMPLEX, SOPHISTICATED	SIMPLE, "BIG DUMB BOOSTER" CONCEPT
SUBCONTRACTORS	MANY	FEW
INTEGRATION	PRIME CONTRACTOR FOR MANY SUBS	PRIME (BWYIC) ONLY
TEST	MANY INTERFACES, TIME CONSUMING	SIMPLE, DIRECT
CONFIGURATION CONTROL	MANY ICDS, COMPLEX MANAGEMENT STRUCTURE	SINGLE ORGANIZATION, DIRECT MANAGMENT CONTROL
DOCUMENTATION	VAST, COMPLEX, REDUNDANT, EXPENSIVE	CRISP, RIGOROUS
MANAGEMENT LUNCH	EXECUTIVE DINING ROOM	LAZY SUSAN, CHOPSTICKS
OVERHEAD	VERY HIGH	LOW
INSTITUTIONAL SUPPORT	HEAVY: PR, CR, EEO, AAP, LEGAL, CONTRACTS, FOI, PROCUREMENT, ETC., ETC.	LIGHT, NECESSITIES ONLY
MAIN ENGINES (TO LEO) TYPE (NO.)	SEVERAL DIFFERENT DESIGNS AND THRUST LEVELS: TITAN: UA-1203 (2), LR-87(2), LR-91(1) ARIANE: PAP P7.3(4), VIKING 6(2), VIKING 5(4), VIKING 4(1)	ALL ESSENTIALLY THE SAME: YF-20(8), YF-22(1)
STRAP-ON BOOSTERS	DIFFERENT FROM CORE, INCLUDES SOLIDS	SAME AS CORE, ALL LIQUID
STRUCTURE	COMPLEX, LIGHT, MILLED PROPELLANT TANKS	SIMPLE, FORM AND WELD
SIZING FOR COMMERCIAL	TITAN: OVER-SIZED DELTA: UNDER-SIZED	LM-2E: IDEAL

MANY OTHER PROGRAMMATIC, INSTITUTIONAL, TECHNICAL, AND PERFORMANCE ISSUES CAN BE DISCUSSED RELATIVE TO THE VERY SOPHISTICATED AND COSTLY U.S. ELVS AND ARIANE COMPARED TO THE INEXPENSIVE AND SIMPLE "BIG DUMB BOOSTER" CONCEPT TYPIFIED BY THE CHINESE LONG MARCH. NUMEROUS PAPERS AND ANALYSES OF THIS CONCEPT IN OVERALL COST AND PERFORMANCE, ESPECIALLY FOR PAYLOADS DELIVERED FROM EARTH TO LEO WHERE EVEN GUIDANCE NEED NOT BE PRECISE IF SUBSEQUENT MANEUVERS ARE TO BE PERFORMED. A MORE THOROUGH SURVEY OF THE COMPARISONS WOULD MOST LIKELY EVEN FURTHER SUBSTANTIATE THE LOWER PRICE OF A SIMPLE BOOSTER SUCH AS THE LONG MARCH.

IN CONCLUSION, FROM A PROGRAMMATIC AND TECHNICAL POINT OF VIEW FOR PAYLOADS FROM EARTH TO LEO, THE LONG MARCH 2E SHOULD BE SIGNIFICANTLY LESS EXPENSIVE PER PAYLOAD POUND THAN THE COMMERCIAL TITAN 3. ADDITIONALLY, IF THE TITAN 3 CONTINUES TO OFFER UPPER STAGES COMPARABLE TO THE STV, THE MARKET DIFFERENTIAL FOR DELIVERY OF A SATELLITE TO GEO WILL BE EVEN GREATER THAN IT IS TODAY -- QUANTITATIVELY, QUALITATIVELY AND OBJECTIVELY.

AS A POTENTIAL ADVANTAGE WHICH COULD BE INCORPORATED INTO THE U.S. ELV INDUSTRY, SST HAS ATTEMPTED TO OBTAIN U.S. GOVERNMENT SUPPORT AND COOPERATION IN DEVELOPMENT OF THE STV FOR OVER FIVE YEARS -- SUPPORT AND COOPERATION WHICH ARE IN DIRECT CONCERT WITH EVERY SPACE POLICY PUBLISHED DURING THIS

ADMINISTRATION. TO DATE WE HAVE HAD LITTLE SUCCESS. WE WOULD BE MOST APPRECIATIVE OF ANY SUGGESTIONS, COMMENTS, COUNSEL, ASSISTANCE OR OTHER INTEREST THAT CONGRESS MAY BE ABLE TO PROVIDE IN THIS MATTER.

AND FINALLY, PERHAPS A FEW WORDS ON MY PERSONAL QUALIFICATIONS TO RENDER THIS ASSESSMENT WOULD BE HELPFUL TO THE CONGRESS. AS BACKGROUND, I HAVE PARTICIPATED DIRECTLY IN THE DESIGN, MANUFACTURE, TEST AND LAUNCH OPERATIONS OF SPACECRAFT PRODUCED BY MCDONNELL DOUGLAS, ROCKWELL, GRUMMAN, AND BOEING; AND SIMILARLY, LAUNCH VEHICLES BUILT BY MARTIN MARIETTA, LOCKHEED, ROCKWELL, AND NASA. I HAVE PARTICIPATED IN DETAILED TECHNICAL EVALUATIONS OF SOVIET SPACECRAFT AS SPECIAL ASSISTANT FOR MISSION OPERATIONS DURING THE APOLLO SOYUZ TEST PROJECT; AND, I HAVE TWICE OBSERVED THE CHINESE LONG MARCH IN FINAL ASSEMBLY. ADDITIONALLY, I HAVE BEEN A NASA CENTER DIRECTOR AND I HAVE EARNED TWO GRADUATE DEGREES IN AERONAUTICS AND ASTRONAUTICS FROM MIT.

AT ANY RATE, SST BELIEVES A MORE POSITIVE APPROACH TO IMPROVE COMPETITIVENESS OF THE U.S. ELVS WOULD BE TO EMPHASIZE THEIR TECHNICAL ATTRIBUTES AS WELL AS TO FOCUS ON REDUCTION OF COSTS AND INCREASE IN PERFORMANCE (BY, FOR EXAMPLE, THE INCORPORATION OF THE STV), RATHER THAN ATTEMPTING TO ELIMINATE SOME OF THE COMPETITION IN A NEGATIVE MANNER BY THE APPLICATION OF

INSTITUTIONAL ISSUES. THE LATTER APPROACH IS NOT REALLY CHARACTERISTIC OF THE MANNER IN WHICH WE BELIEVE OUR COUNTRY SHOULD OPERATE. WE SHOULD SEEK EVERY OPPORTUNITY TO IMPROVE OUR PRODUCTS AND PERFORMANCE AS A TEAM. NATIONAL SPACE POLICY IMPLIES TEAM WORK AND DEFINES MANY AVENUES OF COOPERATION AMONG GOVERNMENT, INDUSTRY, THE COMMERCIAL SECTOR, AND THE INTERNATIONAL COMMUNITY. IMPLEMENTATION OF THIS POLICY IS "ALL" THAT REMAINS.

THANK YOU.

The CHAIRMAN. Thank you very much, Dr. Scott.

Mr. Lujan?

Mr. LUJAN. I don't have any questions, Mr. Chairman. I have enjoyed the lesson in how those costs can be brought down. I think that's very good. I think that's what competition is all about.

The CHAIRMAN. Well, just one thing I wanted. What you're saying, at least if I'm hearing you correctly, is that in your approach to the turnkey approach that you developed with your company, you consider yourself being able to compete?

Mr. SCOTT. Yes, sir.

The CHAIRMAN. Even using United States launching companies?

Mr. SCOTT. I believe if we are able to procure a U.S. ELV at the right price and interface it with the right upper stage, then we can become competitive with anything else. But we have to be able to meet those conditions.

The CHAIRMAN. When do you think that Dominion will apply for an export license with—through the State Department?

Mr. SCOTT. I should think it would be in the near future. We don't have a specific date. Dominion is still seeking the final round of financing to complete their project, but their business plan is heavily dependent on a launch next year, followed by a second satellite early in 1990. So part of their reasoning and their rationale for utilizing our services in the Long March is because the Long March is the only launch vehicle available in that timeframe.

The CHAIRMAN. All right. Thank you very much, Doctor. We appreciate very much your being with us.

That concludes our hearing for today. We will have Secretary Carlucci on Tuesday, and I think we have a couple of other people, the U.S. Trade Rep and some members on Tuesday.

So I want to thank you very much, folks, for having the patience to be with us. We are now adjourned until next week.

[Whereupon, at 4:10 p.m., the committee was adjourned.]

THE ADMINISTRATION'S DECISION TO LICENSE THE CHINESE LONG MARCH LAUNCH VEHICLE

TUESDAY, SEPTEMBER 27, 1988

House of Representatives,
Committee on Science, Space, and Technology,
Washington, D. C.

The committee met, pursuant to recess, at 10:15 a.m., in Room 2318, Rayburn House Office Building, Hon. Robert A. Roe [chairman], presiding.

The Chairman. The committee will reconvene.

We have two further witnesses this morning on our overview, oversight hearing if you like, of the Long March rocket issue.

We have with us Representative Patricia Schroeder, from Colorado. Pat, we welcome you, and go ahead and make your presentation.

STATEMENT OF THE HONORABLE PATRICIA SCHROEDER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF COLORADO

Mrs. Schroeder. Thank you, Mr. Chairman. I want to thank the committee for letting me come by, and ask unanimous consent to put my whole statement in the record.

The Chairman. If no objection, so ordered.

Mrs. Schroeder. Let me just quickly summarize because I, like everybody else, have always got too much to do every morning, and I've got a committee I'm supposed to be chairing at 10:30. So let me just briefly say why I've been troubled by this Long March rocket.

Number one: I serve on Armed Services, and, as you know, the Chinese have been supplying the Silkworm missile to Iran.

Number two: The Chinese have made it very clear that one of the ways they intend to arm their military, which now is huge but it doesn't have very sophisticated armaments, is to move into the weapons production area such as the Silkworm missile and to sell that all over the world, and then with the profits be able to re-arm their military. And, if you watch what they've done with countries like Thailand and others, they have literally taken over our role as the supplier because they undercut us every single time. And, you know, question: Where is that leading, and where is that going?

And so I have been very troubled that after the Administration encouraged many of our corporations, our private corporations, to move into space launch privately—mainly because after the Challenger disaster they said: "Look. We're only going to put military payloads on these Government ones because we're so far behind, so let's get the private sector going." And, as you know, the French and others were ahead of us. They did invest a lot of money on that work, and the real problem is you cannot compete against a state-subsidized industry such as the Chinese industry. So, all of these supposed concessions such as, "We'll make sure it's fair market price," there's no such thing. I mean, it doesn't work.

And I am also terribly troubled as to how we would protect the kind of technology we have on the satellite that they're going to be launching. Those satellites are very similar to some of the ones that the Navy has gotten that are very, very high tech.

So I have all those questions out there about what in the world are we doing. I'm, obviously, all for trading with the Chinese. I'm, obviously, for all of those kind of things, but I don't think you do it in this high a technology area. I also don't think you allow them to undercut our private sector that can compete head to head with the private sector in other parts but cannot compete head to head on state-subsidized industries such as the Long March missile.

So those things trouble me a lot, and that's basically why I am here. Because I just feel that we have seen some tremendous things happen in the last year with technology transfer, with high technology loss in that area, and I just think we ought to go slow on this and make sure we really know what we're doing, rather than let the horse out of the barn and then suddenly say, "Oops! there it went again!".

So that's basically what my testimony says much more prosaically than I have just spit out. There it is.

Mr. NAGLE. We assume that.

Mrs. SCHROEDER. Well, I know. I know. It's hard for me to get my tongue wound up in the morning.

[The prepared statement of Ms. Schroeder follows:]

Mr. Chairman, Thank you for giving me the opportunity to appear before the subcommittee. If I told you that the Reagan Administration, the champion of the free enterprise system, was going to give a state subsidized and run industry in a Communist nation a substantial market share of a new industry at the expense of American companies, what would you think? You would probably think I'm hallucinating. And if I told you that these very same American companies were encouraged by the Reagan administration to enter this new market, you would probably think that I had gone off the deep end. After all, we all know that the Reagan administration would never make a decision that could cost American workers jobs and hurt U.S. industry.

Well believe it or not, the facts say otherwise. The Reagan administration wants us to believe that the current deal negotiated with the Chinese to launch American-made satellites is good for the U.S. From what I see of the facts, this deal is going to cost American jobs and industry.

The beginning of the commercial launch industry is in many ways the result of the Challenger accident. We have been able to put this tragedy behind us and start anew at rebuilding our space program. Part of this rebuilding has been the development of our commercial launch industry. On Thursday, the Space Shuttle is scheduled to take off on its first mission since the disaster. It would be nice to think that the space program was back on track. Unfortunately, the picture is far from rosy.

According to Administration policy, a major factor in the "rebuilding" of the space program is the development of a commercial space launch industry. Due to a puzzling shift in this same policy however, the viability of our commercial space program is in danger and the security of sensitive American technology is threatened.

In August of 1986, President Reagan decided to commit the Space Shuttle to primarily military payloads. This was due to the backlog in satellite launches that the Challenger accident left. This decision, together with an earlier Administration decision to encourage the growth of a commercial launch industry, left a new commercial space launch market to be exploded by U.S. firms. As a result, U.S. aerospace firms have invested close to $500 million in developing a commercial launch capability.

Unfortunately, the Reagan Administration's September 9 announcement to let the Chinese launch industry boost three American-made communications satellites into orbit puts this investment in jeopardy.

International competition would not be that bad if all of the companies were on a level playing field. But, this is far from the case. The Chinese launch industry is subsidized by the Chinese government. As a result, the Chinese do not have to turn a profit. In fact, they can charge up to 50% less than U.S. launch firms. Obviously, government subsidies make it extremely difficult, if not impossible, for U.S. firms to compete.

In addition, the Administration has failed to explain how sensitive satellite technology invoLoved in this transaction will be safeguarded. Because of the Toshiba and Konigsberg incidents, all of us on the Science, Space, and Technology, and Armed Service Committees are sensitive to issues involving the transfer of technology that relates to our national security. It would seem prudent that we exercise extreme caution in these transfers. Unfortunately, the Administration doesn't seem to share my views on this. In no way can we be guaranteed that the technology aboard these satellites won't be compromised.

I would like to consider this deal on its merits, but I haven't been able to figure out any merits. All I can see this doing is threatening national security and costing American jobs. In my district in Denver, Martin Marietta's Commercial Titan Systems employs close to 2,500 people. My constituents aren't going to understand the benifits of this "sweetheart" deal if Martin has to close down its plant and lay off 2,500 employees so that sensitive American technology can be transferred to a government-run, government-subsidized industry in China.

If the Administration is truly serious about establishing a domestic launch industry and protecting sensitive technology, they should simply cancel the deal.

The **CHAIRMAN**. Okay. The Chair recognizes for questions the distinguished gentleman from New Mexico, Mr. Lujan.

Mr. **LUJAN**. Thank you very much, Mr. Chairman.

And, Pat, we all agree with you. What we, and I think everyone on this committee, is very concerned about is the effect on the private launch industry. We are doing everything that we can to encourage that industry. We think it's good from a business standpoint to have a backup to our defense and all of that. I'm not really sure what we can do in this particular case about these three satellites.

For example, the one satellite that was recovered belongs one-third to the Chinese, one-third to the British. The British testified that they were specifying that—first of all, the satellite was refurbished here. It's not our satellite, it's theirs. And they said, "Okay, you fix our satellite but we want it launched on the Long March because there are other business considerations for us, for this company, with the Chinese." So what we got was the piece of the action just to refurbish it and we never had a chance to launch it.

Mrs. **SCHROEDER**. Well, I hear you. But I think we have to be terribly skeptical about that because look at '92. Nineteen ninety-two, we're going to have the "United States of Europe", which the British will be a part of.

Mr. **LUJAN**. Yes.

Mrs. **SCHROEDER**. We don't know what kind of trade proposals they're going to have vis-a-vis us. We don't know what kind of contacts they're trying to make with the Chinese vis-a-vis our commercial interests. And I don't think we've thought through the 1992 impact, and so I'm not at all assured by the British saying that they got to deal with the Chinese. Terrific. What's their deal? What's our deal? Where do we go?

The CHAIRMAN. If the gentleman would yield? By the same token, the committee is highly aware of this. We have discussed this in depth just recently when we were in Europe, and this committee recognizes that the economic dynamics of the future are going to lie in the Pacific, not in the situation in Europe.

If the gentleman would yield further, you make the point about undercutting our private sector. We don't disagree with you. But you've got to remember certain basic facts, however. Of the 3 satellites involved, 2 of them are owned by Australia and one is owned by the Chinese, the British, and the Hong Kong—what do you call it?—Group. That's number one.

Mrs. SCHROEDER. Consortia. Yes.

The CHAIRMAN. Consortia. The second point is that the argument arises that the assumption that the United States launching capability, our private sector is going to—if we were to vitiate or negate the Long March, that they're going to get the contracts, is fallacious.

Mrs. SCHROEDER. That's true.

The CHAIRMAN. It is not so. It is going to go to somebody else. The Australians told us that flat out.

The second point: One comes back and says, "Well, therefore we lose the whole thing because then we lose the fabrication and manufacture of the satellite, per se, itself." Okay?

Mrs. SCHROEDER. Okay. Well—

The CHAIRMAN. No, wait. Let me finish now.

That's number one. So therefore we're willing to throw $400 million away. That's one possibility.

The next scenario comes back and says, "Well, okay. If we let them go ahead and launch, then we're taking those particular programs away from our domestic launching group," which we discussed in a lengthy, one 18-hour or 16-hour hearing. Then they come back and say, 'Well, we'll put up $250 million of our own money to start our program going in the private sector." And they're right.

Then we come back to the next group, who testified separately, which is McDonnell Douglas, which is all part of the record, which is one of the 3 launching groups, and they come back and they say, well, they're really a little bit concerned as to how to move themselves because they have a billion dollar contract with the Chinese in developing and manufacturing the MD-80 in Shanghai. So there is a much broader based financial interest to the United States corporations in China than just the launching of those particular rockets which belong to some—those particular satellites which belong to somebody else.

What the committee is wrestling with fundamentally is that if the Chinese do their bit here, can we control the situation further? The answer is yes, we can. And what does the United States do to further enhance the capability of our private sector launching companies involved? Now we just passed a very important piece of legislation, which we had a discussion with others on whether the Administration would veto or not, which, in effect, would be a major underpinning to our private sector. The insurance issue is a major issue to our private sector, etc.

And then the third question that comes back to us, one point you made, that when the White House decided that only commercial launches would not be placed on our own shuttle particularly and ELVs would be used for other launches; query: Should we be having more of the armed services launches take place on our private sector rockets, which is really something that's got to be looked at in the longer range?

So, in effect, what we're saying here is that if we're going to have a dynamic private sector launch capability it's not going to be borne or defeated by the Long March rocket by any stretch of the imagination at this point unless we let it go further.

I thank the gentleman for yielding.

Mrs. SCHROEDER. Well, Mr. Chairman, I hear what you're saying, and I think the key to what you said is "at this point."

The CHAIRMAN. Exactly. That's why I said it.

Mrs. SCHROEDER. I am terribly troubled that the Chinese don't belong to COCOM. I am terribly troubled as to how we protect the technology on that satellite, which right now, you know, we can do, the Chinese can't do. They're going to get American technology in their launch capacity by doing this, and, as I say, these are the same guys that are selling the Silkworm to Iran.

And, also, if you shift it to that Pacific—

The CHAIRMAN. As we are selling our missiles and our arms to others, too.

Mrs. SCHROEDER. Well, not Iran, hopefully.

The CHAIRMAN. Well, hopefully. But others too, nevertheless.

Mrs. SCHROEDER. But then I think—

The CHAIRMAN. I don't want to get into that.

Mrs. SCHROEDER. No. But I think then the other troubling part is as we look at that Pacific Basin, clearly there is a head-to-head competition between the U.S., Australia, and many other countries in the Pacific Basin as to who is going to get the most from the Chinese markets, and that's a very interesting question, too. But whenever you have a state-subsidized giant there and everybody wants to get in and trade there, they're going to be able to use these same arguments on anything and we're going to wake up and find out we traded away the store.

And I just don't feel very easy about it when they have been so very clear about what they're going to do with the technology. That's how they plan to arm their military and on and on and on. That troubles me.

The. CHAIRMAN. Well, we share the gentlelady's deep concern, but I think it's important to point out that there is a broad policy issue with China in the first place. And if the Chinese came back to us, which would be understandable, and they say, "Well, look. You know, if you don't want to do business with us, then we just won't do business with you." Now our corporations, the very same ones that are testifying and expressing their concern, which is General Dynamics, Marietta, and McDonnell Douglas, have contravening problems there. The question is does the United States, if you want to look at it in a broader policy point of view, say, "Well, okay. We'll just stop all trade with China."

Now the assumption that there's no transfer of technology, when we set up the MD-80 joint production of the aircraft in China there's nothing happening there; the point that we're developing the Superconductor Super Collider and China has the edge on the manufacturing, if you like, and the production of the crystals that are needed—and so the litany goes.

So the question before us is do we or do we not deal with China because that's what it's really all about, and looking to the future.

Mrs. SCHROEDER. Well, they have made that the question. I don't think that's truly the question. I don't think China can afford not to deal with us long term.

I guess I spent—you know, when I was in college I studied Chinese, so it was my area. They are wonderful at being able to figure out how to negotiate that and how to stick it to us. And because they're so much more pleasant than the Russians, I think they have psyched us out much better than we've psyched them out. But they have to deal with us on many levels, and at some point I think they will respect us more if they understand we're swift enough to figure out, Whoa! you know. We don't go this far. We want some guarantees on some things, and we want to make sure where it's going, and we want ours. We just don't sign off every single time. Because otherwise they keep pointing that gun at our head.

The CHAIRMAN. You've still got the time, yes.

Mr. LUJAN. Well, I just want to close by saying that I think we're all uneasy with this whole thing. You know, we want the business, but on the other hand, we have all those concerns that you're saying. If we go ahead because we want the business, are we selling the rope. That, you know, that all enters into—

Mrs. SCHROEDER. That's right.

Mr. LUJAN. —our minds, and that's the reason for the hearing. But you just have to look at both sides of it, I guess, and that's what we've been trying to do.

Mrs. SCHROEDER. Sure.

The CHAIRMAN. The gentleman from Missouri?

Mr. VOLKMER. Yes. Pat, I have several things that bother me about people who are concerned about us launching on the Long March, as that impacts on our ELV. Commercial industry is one who sponsored the original legislation several years ago to start us on that road and set up DOT as a lead agency. You know, we have had the Ariane out there taking away—subsidizing their launches, taking away our satellites—

Mrs. SCHROEDER. Absolutely.

Mr. VOLKMER. —all along taking away our launches, I haven't heard any member of this committee ever say let's stop it. Let's put a resolution in and let's say that American satellites have to go on American ELVs. Nobody has ever said that.

In September—this month—two U.S. satellites built by U.S. firms went on one Ariane and not one word was said. Not one word. And this impacts on the ELVs.

Mrs. SCHROEDER. But the Ariane is part of the free world, you know. I do have trouble with their subsidies, but you haven't seen subsidies compared to what the Chinese can subsidize. Let's be honest.

Mr. VOLKMER. Oh, yes, I did. I see subsidies right in this country on our own satellites launching.

Mrs. Schroeder. Well. No, I—

Mr. Volkmer. Now I don't want to spend all your time getting into that, but if you think that we've ever recovered the cost of putting a satellite in orbit on our commercial satellites, you better study it again.

Mrs. Schroeder. Their sub—no, no. I'm saying their subsidies are more like ours. That it is not a 100 percent state-owned, state-subsidized everything. I mean, they will say our cost is this. It is not that at all. It's what they charge. Their cost is something entirely different. And I think we have to start making those terms much clearer in international trade, cost versus charge.

Mr. Volkmer. I would hope we have done it. In the past we never have done that. I don't think you're going to get the French to do it. And I think what you're going to see with the French competing against the Long March is that the Ariane's costs all of a sudden are going to go down.

The **Chairman.** We hope.

Mrs. Schroeder. Well, because they understand how important—

Mr. Volkmer. That's what's going to happen. Now what's that going to do to our ELV industry?

Mrs. Schroeder. That's right. Because they—

Mr. Volkmer. They're not going to get those satellite launches. We're going to say to the Chinese, "You can't have them, we'll give them to the French."

Mrs. Schroeder. Well, the French understand how important it is to compete head to head with them.

Mr. Volkmer. Yes. I've had another Member I mentioned this to, that the French were Western and they're our allies and our friends.

Mrs. Schroeder. The French—

Mr. Volkmer. The French are the same people that wouldn't let our planes fly to Libya over France and they had to refuel at night.

Mrs. Schroeder. The French are the Chinese of Europe. We know that and they know that.

Mr. Volkmer. The other thing that I think the chairman attempted to point out, and he did it very well, but I am fully convinced in this whole thing that—and I still have some problem with the security thing, but Secretary Carlucci has assured us, Hughes has assured us, and I'm not that concerned about it anymore. But I am convinced that if we would—the President had said no to these launches, to the Long March, that, number one, the AsiaSat would never have been bought from Hughes, never gone up. It wouldn't have gone up because they're going to—whatever they do they're doing to go on a Long March because the Chinese have a third in that. That's number one.

Number two—

Mrs. Schroeder. Not the two Australians.

Mr. Volkmer. The two Australians would have been rebid, and in the rebidding process because of the price of the Long March as against the Ariane—and I'm convinced Ariane was two and we were three; okay, one of our firms was three—that the British firm would have manufactured those two satellites and they would have been on the Long March. And that's what we have done—would have done.

Mrs. SCHROEDER. Well, I guess I just disagree. My study of that would have been that it's not so much that I am saying here we have to mandate we get the contract. No, I'm not mandating we get the contract. I'm saying I don't mind going head to head with other countries that are partners to COCOM, that we trust, and that we're not worried about the security thing.

But I am concerned when they've been so open about where it is they're going and what they're doing.

The CHAIRMAN. Would the gentleman yield?

Mr. VOLKMER. Yes.

The CHAIRMAN. Pat, are you opposed to even considering the Chinese launching on the Long March? Totally opposed?

Mrs. SCHROEDER. Yes, I am.

The CHAIRMAN. Okay. Well, all right.

Mrs. SCHROEDER. Until—if they want to join up with COCOM, and if they want to, you know—

The CHAIRMAN. No. I understand. So what you're saying basically is the other rationale is immaterial, the question is you're opposed to it.

Mrs. SCHROEDER. I'm opposed to it because I think it's very dangerous for us long term.

The CHAIRMAN. Okay.

Mrs. SCHROEDER. And we have no credibility with Toshiba or anything else when we're doing this.

The CHAIRMAN. Okay. Any other—

Mr. VOLKMER. Let me ask you this then. What do we do in 1992 or 1993 when Japan enters the field? Because they're going to be there then.

Mrs. SCHROEDER. They're a member of COCOM.

Mr. VOLKMER. They're going to be wanting to launch.

Mrs. SCHROEDER. And they're a member of COCOM, and then we'll have to start going head to head with them.

Mr. VOLKMER. They're a member—

Mrs. SCHROEDER. I'm not afraid of competition. But I still think we have to be aware of what world alliances are and who's in them and who's not and, you know, how the players all lay out. And that's what I'm saying.

Mr. VOLKMER. You're not satisfied then that China is nonaligned?

Mrs. SCHROEDER. No.

The CHAIRMAN. No further questions for Mrs. Schroeder? We want to thank you very much for your testimony. We appreciate it. And I know you have to do another thing, so we'll go over—

The CHAIRMAN. The Chair recognizes the distinguished gentleman from New York, Mr. Solomon.

STATEMENT OF THE HONORABLE GERALD B. H. SOLOMON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. SOLOMON. Thank you, Mr. Chairman. And, Mr. Chairman, I apologize for being late.

The **Chairman**. No problem.

Mr. **Solomon**. I'm the ranking Republican on the Veterans Affairs Committee and we were holding hearings over in the Senate. And you know how those Senators are, they go on and on and on. So I'll try to be very brief.

Let me begin, Mr. Chairman, by commending you and the committee for conducting these hearings. The issues have several dimensions. They involve important national security considerations such as the transfer of militarily critical technology. I'm one of the ranking members on the Foreign Affairs Committee that looks into these issues. It also involves major foreign policy considerations such as trade and U.S. relations with China.

However, I think my foremost concern involves assured American access to space, and I think that concerns every member of your committee. Again, we commend you for the excellent job that you do, Mr. Chairman. America must never again be put in the position where we have little or no capability to meet our pressing military and commercial space launch requirements, and I think that's the concern that we're here for today.

Earlier this year, I introduced legislation that would prohibit United States satellites from being launched from boosters owned and operated by China and by the Soviet Union. I think I ought to reiterate: and by the Soviet Union. I have now introduced legislation that would—a joint resolution of disapproval. There have been several reactions to my initiatives. I have met with the Chinese Ambassador to the United States on this matter and talked frankly with him. I have discussed my reservations with the Secretary of Defense, whom I think was here probably just before I got here, and I have received personal assurances from the National Security Advisor, Colin Powell. After all of this, one would think my concerns had been adequately addressed.

But on the contrary, Mr. Chairman, my reservations about the proposals are more serious now than they were before. I do not believe that the agreement is in the overall best interest of the United States, and I fully intend to pursue every effort to derail it, unless my mind is changed by your committee and by my own Foreign Affairs Committee.

Mr. Chairman, there is nothing magical about the 30-day Congressional limit to disapprove sales under the Arms Control Act. There are numerous ways for Congress to sever this transaction, and I intend to pursue them.

You should also know that the other body is looking at this matter very closely as well. Several Senators have expressed their opposition to me, and the ranking member of the Senate Foreign Relations Committee has now introduced the same joint resolution of disapproval that I introduced earlier. And, like many members of this body, they find the technology transfer aspect particularly troublesome, but they are also concerned about the export of American jobs, the increase in the trade deficit, and the obvious damage to the American space effort which will occur as a result of this agreement.

Mr. Chairman, there appears to be some confusion as to the position of U.S. satellite manufacturers on this issue. This is not an industry-versus-industry fight. I spoke with corporate officials from both Ford Aerospace and the General Electric Corporation yesterday, and I would be happy to clarify their position. Ford Aerospace is basically neutral. They believe the U.S. launch industry must be free to compete for international launch opportunities in an environment free of predatory pricing. The General Electric Corporation's position is clear. General Electric, which is a large employer in my area, strongly opposes the export of commercial satellites for Long March. General Electric Company supports the position taken by General Dynamics, McDonnell Douglas and Martin-Marietta.

And, Mr. Chairman, with your approval, I wish to submit two items for the official record. The first is a copy of the August 12 letter that I sent to the National Security Advisor, which was signed by Congressmen Broomfield, Kemp, Lewis, Walker, and Sensenbrenner. The second is an editorial from the September 10 *Chicago Sun Times.* Let me read a part of that editorial.

"Let us suppose you had befriended someone in the ghetto who happened to be peddling drugs, and you said he had to give up that in order for this friendship to prosper. How would you react if the new friend said he couldn't give up drug peddling because he was poor and that was one of the ways he made his money? Now substitute the United States for yourself, China for the friend in the ghetto, and arms for drugs. Now you get the point?"

China's clients include Saudi Arabia, which is buying medium-range nuclear-capable missiles. It also is believed to be negotiating with Libya and Syria—two real fine, upstanding countries. If Washington indeed has bought the excuse of poverty and the promises of responsibility, I think it has bought a lot of hokum.

What I am saying, Mr. Chairman and members of the committee, is that it should not be necessary for the United States to bribe China for acting as a responsible member of the international community. Congress has the authority and clearly the responsibility to take a close look at the agreement and act in the best interest of the United States.

I repeat, take a close look at the agreement, and I would ask anyone of this committee—you over there, Mr. Volkmer; you, Mr. Chairman; you, gentlemen; have you seen that agreement in writing? Do you know what that agreement is? I serve on the Foreign Affairs Subcommittee on International Trade. I have yet to see it. And I have been trying to work with these—with the White House and with the National Security Adviser, with Colin Powell and with Secretary Carlucci, and I have yet to be able to have them tell me either in a classified briefing or in public. What is the written agreement? What are we getting ourselves into?

So, Mr. Chairman, I am not going to belabor the point here except to say that I think we have some serious situations that we really have to look into. I think you and I and all of us had better know what kind of an agreement we're getting into. Are we never going to have a reserve fleet of expendable launch vehicles available to us if we go ahead with this kind of a situation? How in the world is an industry that is subsidized 100 percent by the Chinese government, how are we going to compete with that industry? How is our local industry going to compete? Those things are serious concerns.

And I am not here to criticize the committee. I'm just here to show you my concern and hope that we can work together in both of our committees to try and bring some sense to the White House and let's make sure that whatever we finally end up doing is in the best interest of the United States. Thank you, Mr. Chairman.

The CHAIRMAN. I thank the distinguished gentleman for his lucid testimony.

[The letter to Mr. Powell plus the Chicago Sun-Times article follow:]

Congreſs of the United States
House of Representatives
Washington, D.C. 20515

August 12, 1988

The Honorable Colin Powell
National Security Advisor
The White House
1600 Pennsylvania Avenue
Washington, D.C. 20500

Dear General Powell:

Since the Challenger tragedy, the United States has been struggling to get its space program back on track.

Congress and the President announced a policy that would revitalize the nation's expendable launch vehicle (ELV) industry. The industry responded to the challenge with a significant contribution of its own funds.

Thanks to these combined efforts, our ELV industry has risen from near extinction and we are on the threshold of once again possessing the capability to meet our pressing civilian and military launch requirements.

However, a serious threat to this capability is emerging. The Soviet Union and the Peoples Republic of China (PRC) are offering ELVs on the world market at strictly non-free market economy prices. While the radically low price tags may have some short-term appeal, the long-term effect of such "competition" would be devastating to the entire effort to revitalize the U.S. space industry.

It has already been clearly demonstrated that the U.S. ELV industry cannot compete against a government-produced space launch system. Permitting U.S. satellites to be launched on either the Proton rocket of the Soviet Union, or the Long March vehicle of the PRC - both of which are fully government produced and backed - into the free-economy marketplace would defeat the intent of Presidential and Congressional policy.

The consequences of a failure of our policy to revitalize the U.S. commercial space industry can be summarized in three distinct categories:

1. **NATIONAL SECURITY**

The predatory pricing of the Proton or Long March could cause the loss of domestic companies from the commercial ELV industry. This would decrease the family of vehicles available in the event of accident or grounding and would act to the detriment of our goal of assured access to space. Required civilian and even military payloads could become reliant upon foreign terms and schedules. In contrast, a strong domestic ELV industry would provide enhanced capabilities - in essence a "reserve fleet" - in time of national emergencies.

2. **BALANCE OF TRADE/EMPLOYMENT**

A commercial Delta sells for approximately $45M, an Atlas/Centaur for $55M, and a Titan for $100M. The manufacture and integration of these vehicles amount to approximately 8000 direct American jobs. Furthermore, a good portion of these vehicles will be sold to foreign entities, which will result in an influx of billions of dollars to the U.S. Commercial ELV sales for just the first year alone have amounted to $1 billion. To reward unfair trade practices by either the Soviet Union or PRC at the expense of American jobs and lost trade opportunities would not seem to be the goal envisioned by the President and Congress in our commercial space policy.

3. **TECHNOLOGY TRANSFER**

The U.S. is far ahead of the Soviet Union and the PRC in satellite technology. Integration on a launch vehicle requires extensive and detailed interchanges to assess the full spectrum of structural integrity, dynamics, acoustics, electro-magnetic interference and other technically critical factors.

The close working relationship which would exist between a U.S. satellite manufacturer and its Long March counterpart would result in a one way street of transferring sophisticated U.S. aerospace technology to the PRC.

We heartily approve of the decision to deny licensing approval in the case of the Proton. However, until a similar policy is adopted toward Long March, the problems related to national security, unfair trade practices and deleterious technology transfer described above will not be resolved.

We well understand that the U.S. and the PRC are working toward a more harmonious relationship and we fully support these efforts. However, until an appropriate solution to this matter is achieved, we urge that any license application presented to the U.S. Government for use of the Long March vehicle be denied.

We would appreciate your response to us concerning this matter no later than September 1, 1988. In your response, please describe your involvement with the Long March issue and specific measures you have already or will undertake with regard to resolving this issue. Please include also specific measures you have undertaken or will undertake to permit or deny use of the Long March to launch U.S. satellites. Thank you.

Sincerely,

Bill Broomfield
CONGRESSMAN BROOMFIELD

Jack Kemp
CONGRESSMAN KEMP

Jerry Solomon
CONGRESSMAN SOLOMON

Jerry Lewis
CONGRESSMAN LEWIS

Bob Walker
CONGRESSMAN WALKER

Jim Sensenbrenner
CONGRESSMAN SENSENBRENNER

CHICAGO SUN-TIMES 10 SEPTEMBER 1988

China irresponsible on arms peddling

Let us suppose you had befriended someone in the ghetto who happened to be peddling drugs, and you said he had to give that up in order for this friendship to prosper. How would you react if the new friend said he couldn't give up drug peddling because he was poor and that was one of the ways he made money?

Now substitute the United States for yourself, China for the friend in the ghetto, and arms for drugs. • • •

Now you get the picture.

China has been arming warring and war-contemplating countries right and left in recent years. Guns, shells, missiles, you name it. Particularly the missiles. And to remonstrations from the United States it has given a series of unhelpful answers.

At first, in the case of the Persian Gulf war, it just plainly denied it was selling Iran the Silkworm missiles that caused so much havoc. Of course, it was also working the other side of the street. Then it said nobody had the right to tell it what not to do, an assertion repeated when Defense Secretary Frank Carlucci visited China this week. And then it pleaded poverty: Being a poor country, it said, it had to sell arms to make money.

China's clients include Saudi Arabia, which is buying medium-range nuclear-capable missiles. It is also believed to be negotiating with Libya and Syria. Currently, Western experts rank China as the No. 4 arms exporter, the top three being the United States, the Soviet Union and France. (Lest there be chuckles and accusations of hypocrisy, it should be noted right away that the two superpowers have worldwide security concerns that make their arms sales, however regrettable, a part of their legitimate defense effort.)

Mr. Carlucci apparently was unable to persuade his hosts to change their policy, because the statements at the end of his visit said nothing about China expressing willingness to stop being a merchant of death, only that China conducts and would continue to conduct its arms business "responsibly."

Now, it must be conceded, that China is poor and that China is not the only country to use need of foreign exchange as its motive in selling arms. It has company, e.g., Brazil, Israel, South Africa. But unlike those others, China is one of the *Big 5* in the world, one of the five permanent members of the United Nations Security Council, with a special responsibility in the maintenance of peace worldwide. So if it wants to talk about acting responsibly, that is the responsibility it should focus on.

And as for the United States, Mr. Carlucci seems to be indulging in some kind of acquired Oriental inscrutability when he says he was "fully satisfied" with the discussions on arms sales and that he hopes "we can put this issue behind us."

If Washington indeed has bought the excuse of poverty and the promises of responsibility, it has bought a lot of hokum. It has put political convenience above concern—and responsibility—for peace by not fully exploiting its enormous trade and aid leverage in Beijing.

China's Missiles

THE POST

CHINA'S SALES of long-range missiles to Middle Eastern governments increase all of the obvious dangers there. Frank Carlu[illegible], the secretary of defense, brought up the missile business in his talks this week with the Chinese. China's defense minister brushed off the subject with the familiar "Who, us?" response. That's not a promising sign.

China claims that it never sold Iran the Silkworm missiles that Iran has now trained on the Persian Gulf shipping lanes. If that's true, it means that China has been selling the Silkworms to third parties with no conditions on resale—an implication that is, if anything, more disturbing than a direct deal with the Iranians. China has also sold Saudi Arabia missiles with a range of more than a thousand miles and the capacity to carry nuclear warheads. Other Middle Eastern countries also appear to have Chinese-built missiles. China doesn't seem to care much to whom it sells, as long as they are not within missile range of China's own borders.

It's getting harder to control the international traffic in high-technology weapons. Until recently, there were only a few sources of missiles—this country, the Soviet Union and Western Europe. But those governments are becoming uneasily aware that as a threat the missiles rank second only to nuclear weapons. Last year the United States and six of its allies announced tight restrictions on missile sales, and the Russians have become increasingly cautious.

As a result, several Third World countries are finding that they can earn very large amounts of hard currencies by providing missiles to other Third World countries. China isn't alone. North Korea is reportedly helping Egypt develop missiles. Brazil, which is emerging as one of the world's leading manufacturers of armaments, has apparently sold Libya missiles, scheduled to be delivered in a couple of years, that by some accounts will be able to reach Cairo and Jerusalem.

But if China isn't the only purveyor, it is the leader. As long as the Chinese remain impervious to American concerns about their missiles, pressure will grow in this country to reconsider the sale of American military technology to them.

The **Chairman**. Let me point out to you what is said around here. We have 48 members on this committee. I didn't need the briefing that we went through on Friday for about 10 hours on this issue because I've been intimately involved with the whole thing from the beginning, but we had about 9 members show up. On my desk for the last 25 years I have a plaque which is before me all the time when I'm looking for an answer. On the plaque it says that "More mistakes are made from lack of facts than from poor judgment." More mistakes are made from lack of facts than from poor judgment.

And let me suggest the following: We share your concern. But first and foremost, this committee has literally been fighting tooth and nail from January this year and last year, but January this year particularly, in enhancing and trying to build our space program. The decision that was made in 1972—if the gentleman will indulge me—to put everything, all of our launch capabilities on the shuttle was a terrible error in judgment. Everybody now can say, "Hey! Hosanna! Hosanna! We shouldn't have done it."

The development of a strong ELV program in this country is critical to our whole space program. No matter who's President of the United States, that is essential to us. And to that direction, this committee has written very strong legislation and are moving in that direction right now.

I think when the White House made the decision in the interest of the Nation that we ought to have a very viable, strong commercial private entrepreneurship in this country was a very wise decision to be made, and we strongly support that in every way we possibly can to get that achieved. With or without the Long March, with or without the Proton, or anything else that's out there, we will not be able to develop a strong, independent commercial launch capability in this country unless we do certain basic things in legislation, which does and does not in part have to do with proper pricing and fair, equitable pricing internationally.

The insurance issue is an absolutely essential, critical issue or we will not have any independent private launching capability at all. It's important to us that we have that independent launch capability because if we go from a year-to-year program and appropriations as far as defense is concerned, how can we build up a reserve fleet of those ELVs that we're going to need? And we hope to be able to launch the shuttle, hopefully—successfully God willing—on Thursday of this week.

So therefore we see that whole picture enormously clearly and this committee has been doing a great deal about it over the last 2 years, as you know, and have been doing it successfully. That's number one. I think that's important to say.

But to assume that because we do not support the Chinese to launch these 3 satellites that are involved, and we'll get into that in a minute, that we are then going to enhance a strong, independent private entrepreneurship in this country is sheer nonsense. That will not happen unless we do certain additional things. I, for one, believe that not only should we be talking about increasing that capability for the private launch people, we should take more of our military satellites and our intelligence satellites off of the budget direction and, in effect, give them out or put them out to bid for the private sector to build that sector up. I think that's critical to the country.

Now what do we really have before us. On your statement, on page 7—and forgive me, because we have learned a great deal in the last, you know, 2 days or 3 days too. You say on page 7, "Mr. Chairman, there appears to be some confusion"—please—"there appears to be some confusion as to the position of the United States satellite manufacturers on this issue. This is not an industry versus industry fight. And I spoke with corporate officials from both Ford Aerospace and the General Electric Corporation yesterday, and I would be happy to clarify their position."

And, if the gentleman will indulge me—"Ford Aerospace is basically neutral. They believe the U.S. launch must be free to compete for international launch opportunities in an environment free of predatory pricing." Predatory pricing we thoroughly agree with.

"The General Electric Corporation's position is clear. General Electric, which is a large employer in my area,"—and mine, too, by the way—"strongly opposes the export of commercial satellites for Long March."

Now the interesting point was, when they quoted, General Electric quoted with Long March too. Okay? Everybody quoted with Long March. Now what is the case before us? Fundamentally, the basic case before us, there are 3 satellites involved. Two of the satellites are owned by the Australian government and their corporate representative in the field, and the third is the rehabilitated satellite which is owned by the People's Republic of China, by Britain, and by a consortium from Hong Kong. That's what we're dealing with.

Now when we had the Australians testify, they told us flat out that if we have to go back after this thing and rebid it, they will start now to look to different sources to be able to provide the satellites per se, and have to go into a whole new approach. So there's no guarantee, if we negate or vitiate this license idea, that we're going to get that business in the first place. Now what does that mean to us? Forget the Long March. That means we lose the domestic production, the balance of trade payments with Australia, and it is a whole bit of about $400 million on the satellites which would be involved there.

The second issue on this consortium, of which the People's Republic of China are one-third owners, they own the damn thing is what it amounts to, along with the British. They came back and said to us: As far as we're concerned we have to launch that within a time frame, otherwise we are in direct competition with the Soviets. The British testified to this, by the way. And therefore the Soviets and the Japanese will be entering into that marketplace as far as Asia is concerned.

Now that is what we are faced with. Now our representatives who testified before us very eloquently pointed out: Well, you're worried about $300 or $400 million of those particular few satellite manufacturers. We, in turn, have put up hundreds of millions of dollars to develop, on the basis of what our Government said, this private enterprise system.

McDonnell Douglas, converse to that, testified alone. That's the next point. General Electric supports the position taken by General

Dynamics, McDonnell Douglas and Martin-Marietta. They testified separately, McDonnell Douglas, because they have an ongoing program right now with the Chinese in the development of the MD-80 commercial aircraft, which is a billion dollar contract there, plus other things pending.

As we asked Pat Schroeder, we agree that the idea of our building a domestic fleet is critically important to us. We believe that there ought to be fair pricing. We believe in that. But we also believe that our business relationships in the Pacific rim, including China, is terribly important to us on an overall basis, and so is a lot of our—I can say this to you, some of our own—how can I put that?—security relationships with the Chinese, which I know you're familiar with. So there's what we're faced with.

Now the question is do we throw away the baby with the bathwater? Who's baby is it? What do we do? And how do we get the thing organized to be able to do both? I think it's advantageous for us to be able to have a viable working relationship with the Chinese, and I think it's also important for us to provide the domestic legislation we need to create a viable but private fleet of launching capabilities. And there's the rap.

Go ahead.

Mr. **Solomon**. May I respond, Mr. Chairman?

The **Chairman**. Of course. Of course. Of course.

Mr. **Solomon**. Mr. Chairman, as always, you make an awful lot of sense and you always present it in such a practical way. You are a tremendous salesman. You really are, and I commend you for that.

And you've brought up a couple of real cogent points. One of them was that GE was one of those bidding, like Hughes, in order to be in on it. And so were other companies. And, you know, that's why you and I and members of this committee are elected to Congress, because, you know, American business and industry will take what you give them. That's why we've had export control, so that we don't have all of our technology going over to Communist countries or to those particular enemies of ours. And that's why you will see the Commerce Department, for instance, often at odds with the Defense Department. And this is one of those situations where you and I and the Members of this Congress have to be responsible and we have to make sure what we're doing is in the best interests of the United States. Because GE wants us to do what's right. Even though they want to bid, they want to make the money, they still want us to do what's right as far as the controls are concerned.

The **Chairman**. Yes. But, if the gentleman will yield, they can't have it both ways.

Mr. **Solomon**. I know.

The **Chairman**. Okay. Go ahead.

Mr. **Solomon**. You make good sense. McDonnell Douglas, I can understand their coming in here and testifying the way they did because I was in China last year, I saw the McDonnell Douglas operation over there. It's going to make billions of dollars for McDonnell Douglas in the long run, and I can understand that.

But here's the concern I have. You know, we do have export controls as far as high technology is concerned. What happens if we go ahead with this written agreement that you and I haven't seen, and we don't know how its really going to affect the private industry, what happens if we go ahead and we enter into this agreement with China? Now, all of those other countries that you were talking about—Australia, the rest of them—right now they are not doing business with the Soviet Union because of COCOM, because of these controls we have. Now they're going to say: Well, you guys are doing business with the Communist Chinese, you guys have entered into this agreement, what is wrong with us entering into an agreement with the Soviet Union? And then there goes all of our technology. Where do we stand then on our missile development? I just think we have to really look into this and weigh that. Because, Mr. Chairman, you brought it up and it's a cogent point. But how are we going to stop these other countries then? Because right now they are abiding by our foreign policy, United States foreign policy, not to sell, not to enter into those agreements with the Soviet Union.

Sure today China is our friend. Today they are a friendly enemy and we can do business with them as long as we keep our eyes open. But what about the consequences? That's what I'm asking you gentlemen.

The CHAIRMAN. Yes. But if the gentleman would yield, Australia, you got to remember—unfortunately, you couldn't be here, but Australia testified. It is Australia who are supporting the Long March situation, and they're very up front with it. The reason they're supporting the Long March situation is because of the cost. They tell us that up front. So, even though they're a member of COCOM, and, of course, this has to go through COCOM, as you know, or you should know that.

So therefore, as far as we're concerned, the Australians are not opposed to deal—in fact, quite the converse—opposed to dealing with the Chinese as far as the Long March is concerned. And they've told us flat out as far as they're concerned, and they testified to this, that if we decide we want to go some other direction then they will go and rebid this particular program. That's what they've told us.

So, I'm not quarreling with you. I mean that's the facts that we're dealing with, you understand.

The gentleman from New Mexico?

Mr. LUJAN. Gerry, we agree with you. As a matter of fact, one of the preoccupations of this committee is to build up the private launching business both from a business point of point and also we think that it's got some good national security implications. That we do build that up as a backup to the Defense Department.

Now here is the problem that we face, though. We don't own those satellites. No U.S. organization owns them. All that has happened is that somebody came to Hughes and said build us a couple of satellites and launch them in the cheapest way possible. The British even said—and launch them on Long March because we have other interests that we want to pursue with the Chinese. So they're not really our satellites. They belong to somebody else and one of our companies is building them.

So, you know, on the one hand we're free traders. We think—you know, that's one of our philosophies. The other is, we don't want to be too free trading because then we might hurt our own launch industry. And that's the problem that we face right now.

There is no agreement yet. That's why none of us have seen it in writing. There is absolutely no agreement. They have said: We will—we will approve this transaction under certain conditions. That, you know, we watch the technology transfer, the liability, and the pricing. So that's why we haven't seen one.

We just think, you know, that—or at least some of us think that the Long March isn't going to go away just if we deny this export license. What's going to happen is that we just lose the business of building satellites and they're going to be launched on Long March anyway.

Go ahead.

Mr. SOLOMON. I don't want to take up the time of the committee I know, because I know you're very busy. But just in brief response, I haven't—I really didn't dwell on the trade issue because I'm more concerned about the exchange of high technology. But, you know, free trade has got to be fair trade. We know that there's no way that, in that unwritten agreement that we haven't seen yet there's no way that China is going to be able to enter into agreement right now if they're producing these things, or if they're going to be able to launch them for $18 million and it's costing $55 million in this country. What are we going to do, get them to raise the price to $55 million to be competitive after we—

Mr. LUJAN. Well, as a matter of fact, we can, Gerry, because that's the cost. The cost of the launch was $30 million. You know, that's what we got. The cost of insurance was $7.5 million.

Mr. SOLOMON. Right.

Mr. LUJAN. The additional cost because of where they launch from, the angle that they launch from and the reduced time on the satellite—I don't know technically what—that's another $15 million. So that we can substantiate that their costs are somewhere in the area of—what was it?—$52-$58 million, somewhere in there. So we can say you've got to charge that.

Mr. SOLOMON. Just in letting me close, and, Manuel, I really do appreciate your concern and the concern of the committee. The thing that bothers me, though, as a member of the Foreign Affairs Committee, and the thing that should bother your committee is that, you know, you said that we haven't seen it yet. But the Administration—you know I usually carry the water for the Administration in Foreign Affairs. You know, loyalty to the end. The Administration put us on 30 days' notice. The 30-day period is running. We haven't seen any agreement. How can you and I make an educated determination of whether it's good or bad and what we should do with this resolution of disapproval? I don't know what it is. I mean, am I going to just take somebody's word for it? You know, it's tough.

But, again, I really want to tell you how much I respect you, and you, Mr. Chairman. Your committee does a tremendous job on this subcommittee and we take off our hats to you. I've got to get back to my Veterans Affairs hearing or else I probably won't get reelected.

The CHAIRMAN. Well, Jesus! We don't want that.

You want to correct that one thing for the record?

Mr. Volkmer. Yes. You mentioned, I believe, that Australia is a member of COCOM?

Mr. Solomon. Yes.

Mr. Volkmer. As far as I know it's not.

The Chairman. Yes.

Mr. Volkmer. Australia is not a member of COCOM.

Mr. Solomon. Australia, you know, they have treaties with us. Okay?

Mr. Volkmer. Right.

Mr. Solomon. As a matter of fact, these treaties are up for discussion because they won't let our nuclear ships—

Mr. Volkmer. Right.

Mr. Solomon. —go into their harbors, which you and I object to, probably. But they still—

Mr. Volkmer. Australia? I thought that was New Zealand.

Mr. Solomon. They still abide by COCOM.

Mr. Volkmer. I thought Australia did, and New Zealand doesn't.

Mr. Solomon. No, Australia won't either.

Mr. Volkmer. All right.

The Chairman. But—okay.

Mr. Volkmer. Very briefly, I have to agree a lot with what the chairman has said, and my last comment, Gerry, if you really want to have a sustainable ELV industry in this country and you want that industry to be able to compete, not only with the Long March but with the Ariane—that's your competitor. And I think you should know that GE just put up a satellite up for GTE on the Ariane this month along with another satellite made by an American firm. Those are American satellites that are going up on the Ariane. American made for American companies. They are not going on our ELVs, you understand?

And the thing is that, if you want to do it, how much you want to subsidize it? How much do you want to subsidize the ELV industry in order to make it viable? If you're going to say we have to have it to compete with other subsidized, because the Ariane is subsidized. Always has been and always will be. And we've always subsidized our past ones also, on the shuttle.

The Chairman. Well, I want to thank you very much. Go get elected. That's the important thing for us.

Mr. Solomon. Thank you very much, Mr. Chairman.

The Chairman. The committee stands adjourned.

[Whereupon, at 11:00 a.m., the committee was adjourned, to reconvene subject to the call of the Chair.]

APPENDIX I

ROBERT A. ROE, New Jersey, CHAIRMAN

GEORGE E. BROWN, JR., California
JAMES H. SCHEUER, New York
MARILYN LLOYD, Tennessee
DOUG WALGREN, Pennsylvania
DAN GLICKMAN, Kansas
HAROLD L. VOLKMER, Missouri
BILL NELSON, Florida
RALPH M. HALL, Texas
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ROBERT G. TORRICELLI, New Jersey
RICK BOUCHER, Virginia
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RICHARD H. STALLINGS, Idaho
JAMES A. TRAFICANT, JR., Ohio
JIM CHAPMAN, Texas
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HENRY J. NOWAK, New York
CARL C. PERKINS, Kentucky
TOM McMILLEN, Maryland
DAVID E. PRICE, North Carolina
DAVID R. NAGLE, Iowa
JIMMY HAYES, Louisiana
DAVID E. SKAGGS, Colorado
PAUL E. KANJORSKI, Pennsylvania
GEORGE J. HOCHBRUECKNER, New York

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-6371

MANUEL LUJAN, JR., New Mexico
ROBERT S. WALKER, Pennsylvania
F. JAMES SENSENBRENNER, JR., Wisconsin
CLAUDINE SCHNEIDER, Rhode Island
SHERWOOD L. BOEHLERT, New York
TOM LEWIS, Florida
DON RITTER, Pennsylvania
SID MORRISON, Washington
RON PACKARD, California
ROBERT C. SMITH, New Hampshire
PAUL B. HENRY, Michigan
HARRIS W. FAWELL, Illinois
D. FRENCH SLAUGHTER, JR., Virginia
LAMAR SMITH, Texas
ERNEST L. KONNYU, California
JACK BUECHNER, Missouri
JOEL HEFLEY, Colorado
CONSTANCE A. MORELLA, Maryland
CHRISTOPHER SHAYS, Connecticut

HAROLD P. HANSON
Executive Director
ROBERT C. KETCHAM
General Counsel
R. THOMAS WEIMER
Republican Staff Director

October 7, 1988

Eugene McAllister
Assistant Secretary for Economic and
Business Affairs
Department of State
Washington, DC 20520

Dear Mr. McAllister:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

Due to time constraints, Members were unable to ask you several questions for the record. I am enclosing a list of those questions; your responses will appear in the official hearing record and are greatly appreciated.

Also enclosed is your transcribed testimony for your use in correcting, for the printed record, any transcriptional or typographical errors. Please be advised that only transcriptional or typographical corrections will be accepted under Committee rules.

I would appreciate your response to these items within two weeks of receipt of this letter. Please feel free to contact Dr. Bob Palmer at (202) 226-3636 or Dr. Bill Smith at (202) 225-7658 if you require additional information.

Thank you very much for the time you have contributed, on such short notice, toward the hearing record on this important public policy issue.

Sincerely,

ROBERT A. ROE
Chairman

RAR/ls
Enclosures

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Eugene McAllister, Department of State

1. With regard to the three conditions stated for license approval (regarding safeguarding of technology, acknowledgment of liability, fair pricing agreements) please answer the following questions:

   a) What are the specific objectives of these negotiations?

   b) What is the planned timetable for negotiations?

   c) Will the agreements be reached prior to issuance of a license?

   d) What negotiations will remain after the license is issued?

   e) When and in what form will Congress be informed of the outcome of these negotiations?

2. What will be the objectives and the timetable for COCOM approval?

   a) What will happen if COCOM does not agree?

   b) Do you expect COCOM to impose any additional conditions?

3. Inasmuch as fair pricing discussions with the Europeans have taken place over many years without conclusion, what factors have led to the 30 day stated timetable for the Chinese negotiations?

4. What form of participation will the Europeans have in the Chinese negotiations?

5. What will be considered a "fair market" price for Long March launches?

   a) Should Long March be priced proportionally (on a per pound basis) to U.S. launch providers?

   b) Has your department officially acknowledged these Chinese launch prices as "promotional"? Will any more promotional launches be allowed?

6. Will a "quota" on Long March launches be considered as a solution to the fair market pricing issue?

   a) How will this quota be administered?

   b) What will be considered an equitable quota?

   c) How does a quota benefit U.S. industry interests?

   d) If a quota is established, how will the U.S. encourage "fair pricing"?

United States Department of State

Assistant Secretary of State
for Economic and Business Affairs

Washington, D.C. 20520

NOV 10 1988

Dear Mr. Chairman:

I am responding to your letter of October 7 and the attached list of questions from your Committee concerning my testimony regarding the Administration's intention to issue export licenses for certain U.S.-made satellites for launch on Chinese vehicles. Unfortunately, we did not receive your letter until October 28, after our negotiators had left for Beijing.

On October 31, 1988, an interagency team briefed Committee staff on the results of the meetings in Beijing. I look forward to briefing you personally upon your return to Washington. In the interim, I have attached answers to your questions which I hope will be of assistance to you and the members of your Committee.

I would also like to thank you for your efforts to ensure that the Administration had an opportunity to defend its intent to license the ASIASAT and AUSSAT satellites to be launched on the Long March. Your Committee's comprehensive hearings were of great value in focusing attention on the critical questions, and they provided our negotiators with a fuller appreciation of Congressional concerns and timely guidance.

The next round of bilateral discussions is scheduled for late November in Washington D.C. Following those meetings the Administration will be happy to brief the Committee on Science, Space and Technology staff. Please feel free to let me know if you have any additional questions.

Sincerely,

Eug J. McAllister

Eugene J. McAllister

The Honorable
Robert A. Roe, Chairman,
Committee on Science, Space, and Technology,
House of Representatives.

Responses to Questions Regarding Administration Decision on Chinese Launch Services

1. With regard to the three conditions stated for license approval (regarding safeguards of technology, acknowledgement of liability, fair pricing agreements) please answer the following questions:

a) What are the specific objectives of the negotiations?

The Administration's overarching objective is to negotiate a government-to-government agreement with the Chinese which protects U.S. national security fully without jeopardizing a major export opportunity. Specifically with regard to technology, our negotiating objective is to safeguard U.S. technology from possible misuse or diversions. Regarding liability, the U.S. objective is to obtain a PRC governmental commitment that China will indemnify the United States for any claims of U.S. ~~liability~~ under international law resulting from accident. Regarding trade, our objective is to reach a sound bilateral trade agreement that thoroughly safeguards U.S. national security by protecting the U.S. commercial space launch industry against market disruption or possible unfair Chinese practices relating to international competitions to provide commercial launch services.

b) What is the planned timetable for negotiations?

The first round of negotiations was held in Beijing, October 19-21, 1988. During that round we initialled *ad referendum* texts on technology safeguards and liability. We expect the next round of negotiations, which will focus on trade practices, to be held in Washington, D.C., in late November. Additional negotiating sessions, if any, will be scheduled afterwards.

c) Will the agreements be reached prior to the issuance of a license?

Yes, as specified in the Administration's September 12, 1988 notification to Congress, agreement must be reached on all three conditions prior to the issuance of any export license.

d) What negotiations will remain after the license is issue?

The issuance of licenses will come only after a satisfactory completion of the negotiations. There will thus be no negotiations with the Chinese after license are issued. We will, however, hold regular consultations with the Chinese to insure that they are abiding by their commitments, and we would encourage their participation in multilateral space launch "rules of the road" consultations.

e) When and in what form will Congress be informed of the outcome of these negotiations?

The Administration has already briefed the staffs of several committees (see attached list) on the outcome of the October negotiating round, and provided texts of the ad referendum agreements on technology safeguards and liability on a read-and-return basis. We also intend to consult with interested committees further before the next negotiating round. After final agreement is reached, the Administration will provide briefings and copies of the approved text to interested Members of key committees as soon as possible.

2. What will be the objectives and the timetable for COCOM approval?

The objectives are to gain COCOM agreement that all such cases should be submitted for COCOM review and approval and that strict and comprehensive safeguards are required to prevent unwarranted technology transfer. COCOM review commenced on November 8, 1988.

a) What will happen if COCOM does not agree?

Should COCOM approval not be forthcoming, a situation that we do not anticipate, then the U.S. Government would hold consultations with dissenting members to ascertain their reasons for objecting to the cases. Final COCOM approval is necessary before a license can be issued.

b) Do you expect COCOM to pose any additional conditions?

We do not expect COCOM to impose additional technology transfer conditions because the U.S.-PRC agreement on technology safeguards is very stringent and comprehensive.

3. Inasmuch as fair pricing discussions with the Europeans have taken place over many years without conclusion, what factors have led to the 30 day stated timetable for the Chinese negotiations?

   The U.S. Government and the European Space Agency have held discussions on government involvement in, and support for, the commercial launch industry. Although considerable progress has been made in identifying specific governmental practices which directly affect commercial operations, further work is needed on "indirect" supports. The talks have been exploratory and informal, and have not yet progressed to a stage where they could be deemed actual negotiations. (However, a joint preliminary assessment concludes that government involvement in the commercial space industry is roughly comparable in the U.S. and Europe.) In contrast, the negotiations with the Chinese have clearly defined, limited objectives, and will not involve reciprocal commitments on the part of the United States. Although we want to conclude our negotiations expeditiously, we will continue them as long as it takes to negotiate a sound agreement.

4. What form of participation will the Europeans have in the Chinese negotiations?

   We have consulted and will continue to consult closely with the European Space Agency, but the Europeans will not be present at our negotiations with the Chinese. European cooperation will be important to the functioning of an eventual agreement.

5. What will be considered a "fair market" price for Long March launches?

We do not intend to set prices in these negotiations. Our approach is to ensure that the Chinese commit to price their launch services on a par with those prevailing in the international market for comparable commercial launch services.

a) Should Long March be priced proportionally (on a per pound basis) to U.S. launch prices?

There are many factors which influence the price which a launch service company's customers are willing to pay for its services. While important, lift capacity is by no means the only such factor. For example, the location of the launch site affects the lifetime of the satellite, as do limitations on the maneuverability of the launch vehicle. Other factors such as the reliability of the provider, its responsiveness to customer requests and the ease of doing business are also important considerations. The Chinese currently are deficient in many such areas. Chinese customers may therefore insist that China's price be less on a per pound basis than its competitors' prices.

b) Has your department officially acknowledged these Chinese launch prices as "promotional"? Will any more promotional launches be allowed?

The Chinese contend that their proposed price to launch the AUSSAT satellites is "promotional", arguing that this is the first commercial contract for launches of this new vehicle. As Arianespace has made a practice of offering such promotional prices and U.S. companies have told us that limited use of promotional prices is normal commercial practice, the U.S. does not intend to challenge these prices in the negotiations. However, we will insist on clearly defined limits on the use of promotional prices in the future.

6. Will a "quota" on Long March launches be considered as a solution to the fair market pricing issue?

Quantitative restrictions are under consideration as part of a comprehensive agreement addressing, e.g., pricing, government support and marketing practices. However, the Administration has not made any decision in this area.
a) How will this quota be administrated?

This issue is still under discussion within the Administration.

b) What would be considered an equitable quota?

No decision has been made concerning the possibility of using quotas. If we were to go this route, we would consider an equitable quota to be one which both preserves the interests of the U.S. launch industry and is acceptable to our satellite industry and the Chinese.

c) How does a quota benefit U.S. industry interests?

It would benefit the U.S. satellite industry by ensuring more broadly based competition as a means for keeping launching costs in line. It would benefit the U.S. launch industry by preventing the Chinese from disrupting the international market for commercial launch services and providing our industry greater time to prepare to face Chinese competition.

d) If a "quota" is established, how will the U.S. encourage "fair pricing"?

Whether or not a quota is established, there will still be separate undertakings in an agreement concerning price. Of course economic theory suggests that the more restrictive a quota, the higher the price of the restricted item is likely to be.

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October 7, 1988

Mr. Karl Jackson
Deputy Assistant Secretary for
International Security Affairs
Department of Defense
Washington, DC 20301

Dear Mr. Jackson:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

Due to time constraints, Members were unable to ask you several questions for the record. I am enclosing a list of those questions; your responses will appear in the official hearing record and are greatly appreciated.

Also enclosed is your transcribed testimony for your use in correcting, for the printed record, any transcriptional or typographical errors. Please be advised that only transcriptional or typographical corrections will be accepted under Committee rules.

I would appreciate your response to these items within two weeks of receipt of this letter. Please feel free to contact Dr. Bob Palmer at (202) 226-3636 or Dr. Bill Smith at (202) 225-7858 if you require additional information.

Thank you very much for the time you have contributed, on such short notice, toward the hearing record on this important public policy issue.

Sincerely,

ROBERT A. ROE
Chairman

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COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Karl Jackson,
Department of Defense

1. What are the objectives of the negotiations with the Chinese on technology transfer with respect to the AUSSAT export? Do we seek to prevent ~~or~~ simply deter transfer of technologies?

2. What safeguard measures will be put in place for technology transfer?

3. What will be the cost of such safeguard measures:

   a) To the U.S. Government?

   b) To the U.S. private sector?

   c) To any other party including AUSSAT and Asiasat?

4. What will be the cost impact for DOD-related ELV launches if all commercial operations by Martin Marietta, General Dynamics, and McDonnell Douglas cease?

RESPONSES TO ADDITIONAL QUESTIONS FOR THE RECORD

Karl Jackson, International Security Affairs, DOD

Question: What are the objectives of the negotiations with the Chinese on technology transfer with respect to the AUSSAT export? Do we seek to prevent or simply deter transfer of technologies?

Answer: Our objectives for this agreement are that it should limit the exchange of information with the Chinese to that essential to fulfill contractually designated tasks. Controlled technical data must be limited to the minimum essential interface form, fit, and function data that describes mechanical and electrical mating requirements. We seek to prevent the transfer of sensitive technologies.

Question: What safeguard measures will be put in place for technology transfer?

Answer: Procedures for safeguarding this information and technology will apply to the satellite, significant satellite interface technology, and protection of sensitive technologies in the event of an accident during the launch phase. The Department of Defense will oversee electronic inspections and monitoring of compliance with procedures for access to the facilities housing the satellites and related equipment. There will be 24 hour control and supervision by U.S. personnel over the satellite and related equipment during transit to and within China, over preparations at the launch site and during launch pad operations. There will be dedicated, secure payload handling facilities. There will be detailed procedures to minimize foreign access to sensitive technical information and hardware, including significant satellite interface technology. There will be procedures for recovery of parts and debris resulting from an accident during or after launch.

Question: What will be the cost of such safeguard measures: To the U.S. Government? To the U.S. private Sector? To any other party including AUSSAT and Asiasat?

Answer: Questions concerning the cost of implementing these safeguards and the allocation of liability for paying these costs are under review. We do not anticipate that these costs will be excessive. No specific cost information is available at this time, however.

Question: What will be the cost impact for DoD-related ELV launches if all commercial operations by Martin Marietta, General Dynamics, and McDonnell Douglas cease?

Answer: This question would most appropriately be directed to the companies involved. Certainly, if all commercial operations by Martin Marietta, General Dynamics, and McDonnell Douglas were to cease, it likely would have an effect on the cost to DoD of ELV launches. How this might impact on the price the companies would charge the Government would be known only by the companies.

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October 7, 1988

Mr. Roger Sullivan, President
U.S.-China Business Council
1818 N Street, NW, Suite 500
Washington, DC 20036

Dear Mr. Sullivan:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

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Sincerely,

ROBERT A. ROE
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COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Roger Sullivan
U.S.-China Business Council

1. What should be the objectives of U.S. negotiations with the Chinese on:
   a) Technology Transfer?
   b) Fair pricing for launch services?
   c) Liability for Long March launches?
2. How important to China is their entry into the launch services market? What do you think their objectives are?
3. What impact would the denial of the proposed export licenses have?
4. Compare the pending decision on Long March with possible approval of a license application for the Soviet Proton.

Committee on Science, Space and, Technology
Hearing on Implication of the Licensing
Decision on Long March

September 23, 1988

Additional Questions for Roger W. Sullivan
US-China Business Council

1) **What should be the objectives of US negotiations with the Chinese on:**
   - **a) technology transfer**
   - **b) fair pricing for launch services**
   - **c) liability for Long March launches**

Mr. Sullivan: The only difficult issue is "fair pricing." On technology transfer, it is important to recall that the People's Republic of China was removed from the list of prohibited destinations under the Munitions List in 1981 and declared a V-category country (friendly, non-allied) for export control of dual-use technology in 1983. The Departments of State, Commerce and Defense agree that the technology transfer necessary for a Chinese launch of a US satellite is within the limits of what is licensable to China. The US negotiating team should, of course, obtain Chinese agreement not to transfer that technology to a third party without US permission. The Chinese have already given, and honored, such assurances on other US technology transfers.

The technology which cannot be licensed to China is that contained within the satellites. To protect that technology the US negotiating team must obtain Chinese agreement that the satellites will remain under the control of American personnel at all times prior to the launch. Agreement should also be reached with the Chinese to honor any further technical precautions the American side determines at the time of the launch may be necessary to protect sensitive satellite technology.

I think everyone agrees that China must indemnify the US against any liability or claim that may arise as a result of a Chinese launch of these American-made satellites.

The most difficult issue is "fair pricing." It is difficult because it is not solvable in bilateral negotiations with China. Even if China agreed to some pricing standard there would be no gain for the United States if other providers of launch services such as France or perhaps soon Japan did not adhere to the same pricing standards. This is a multilateral problem and in order to get all providers of launch services to adhere to a standard of fair pricing, we need to convene a multilateral meeting of all these concerned countries and seek such an agreement. If that effort failed or we found the pricing standard still left American launch service providers at a competitive disadvantage, the Congress and the Administration would have to decide whether they were prepared to authorize the payment of subsidies sufficient to maintain a private-sector launch capability. Consideration of these issues goes beyond the scope of this hearing.

In the current negotiations with China, however, there are two interim steps that could be taken; first, gain their agreement to participate in such a multilateral forum once it can be convened; and second, seek their agreement to limit the number of their launches for some mutually agreed period pending the results of later multilateral negotiations. In short, seek a kind of "orderly marketing" arrangement with the Chinese on satellite launches--but one which would terminate either when replaced by a multilateral agreement or upon failure of a multilateral forum to reach agreement.

2) How important to China is their entry into the launch services market? What do you think their objectives are?

Mr. Sullivan: China is making a major effort, against heavy odds, to modernize their economy and raise the living standards of the Chinese people. To do this they realized they needed good relations with the industrialized world and more market-oriented economic policies at home. That is a major reason why they sought normal diplomatic relations with Japan and the United States in the 1970's and economic reform in the 1980's. They also saw they had to take advantage of every comparative advantage or window of opportunity they could identify to earn the money to meet their almost limitless import needs for machinery, equipment and technology.

It is not clear whether they consider satellite launch services a comparative advantage or a window of opportunity, although I would guess the latter. In any case the Chinese have a space industry they are proud of. On their own they have developed missiles and launched their own satellites. Their missiles may be "Model T's" compared to ours, but they get the job done. They saw an opportunity, as did other nations, to get into the launch business after the shuttle disaster. The launch services market offers them an important new source of foreign exchange earnings at a time when they have been forced to cut back on purchases from us as well as others because of foreign exchange shortages. Whether they seriously expect to be able to compete over the long term I do not know, but even if their sole objective is earning foreign exchange during this window of opportunity, that is a very important objective for a country which fears that every time they become competitive in a sector, efforts are made in Europe, Japan or the United States to shut China out.

3) What impact would the denial of the proposed export licenses have?

Mr. Sullivan: The most immediate impact would be that the United States would almost certainly lose approximately $450 million in export earnings with no counterbalancing commercial benefit. A less likely outcome would be that Hughes Aircraft's customers would agree to switch from the Long March to Ariane for launch services. Again no gain for the United States but considerable damage caused to the rapidly expanding US-PRC commercial relationship. The Chinese place high value on what they consider fair practice in international relations and this affects their commercial decisions. In the 1970's when China believed that the Ford Administration was dragging its feet on normalization, our lucrative agricultural exports fell away to almost zero. Today when American farmers are finding it difficult to market abroad, agricultural products are the fastest growing category in our booming export sales to China. I find it difficult to understand why anyone would want to risk disruption of US-China trade in the absence of any clear, demonstrable benefit to the United States.

Most serious of all, however, would be the deleterious impact on long-term American interests of a decision to use the export license system to block a transaction when it is clear there is no technology transfer issue to justify such denial. From the very earliest days of security controls over exports, the Congress, the Administration and our allies have scrupulously avoided any linkage between security issues and commercial advantage. We are outraged, and justifiably so, when other countries resort to whatever stick at hand to gain competitive advantage. As a major exporting nation, and one whose economic well-being over the next decade will be determined in large part by how open the world economy remains, we would be ill-advised to be the country which sets the precedent that it is an acceptable trade practice to misuse the export licensing system for protectionist or competitive reasons.

4) Compare the pending decision on Long March with possible approval of a license application for the Soviet Proton.

Mr. Sullivan: The Soviet Union is a prohibited destination for Munitions List items or technology. China is not. The Soviet Union is considered a country which threatens the national security of the United States. Consequently very strict controls are placed on exports to the Soviet Union under the export licensing system.

China, by contrast, has been designated by the President as a "friendly, non-allied" country to which a much higher level of technology and products which embody technology may be sold. Approval of this license for a launch in China sets no precedent for the Soviet Union. There is no valid technology transfer issue innvolved in the Long March launch because the level of technology is well within the limits on technology approvable for sale to China. In the case of a Soviet Proton application, however, there would be a very serious technology transfer issue. Barring substantial improvement in US-Soviet relations, the Administration would almost certainly not approve a license for a Soviet launch. As in the China case, a disapproval could result in commercial loss. The difference,however, and it is a major one, is that there is no compensating benefit of denying the license for a China launch. In the case of the Soviet Union, denial of a license for a launch would a compensating benefit: protection of the national security by the legitimate application of the export licensing system to deny the Soviet Union technology which is approvable for sale only to friendly countries.

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R. THOMAS WEIMER
Republican Staff Director

October 7, 1988

Ambassador Arthur Hummel
4923 Essex Avenue
Chevy Chase, MD 20815

Dear Mr. Ambassador:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

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ROBERT A. ROE
Chairman

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COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Arthur Hummel, Former Ambassador to the PRC

1. What should be the objectives of U.S. negotiations with the Chinese on:

   a) Technology Transfer?

   b) Fair pricing for launch services?

   c) Liability for Long March launches?

2. How important to China is their entry into the launch services market? What do you think their objectives are?

3. What impact would the denial of the proposed export licenses have?

4. Compare the pending decision on Long March with possible approval of a license application for the Soviet Proton.

ISC

ARTHUR W. HUMMEL, JR.
4923 ESSEX AVENUE
CHEVY CHASE, MARYLAND 20815
—
TELEPHONE (301) 654-5321

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OCT 24 1988
Committee on Science, Space
and Technology

October 20, 1088

Chairman Robert A. Roe
Committee on Science, Space
U.S. House of Representatives
Suite 2321 Rayburn Building
Washington DC 20515

Dear Chairman Roe,

I want to thank you for giving me the opportunity to appear before your Committee in support of the Administration's position on the Long March launch issue on September 23.

I have your letter of October 7, and I have already returned the corrected transcript of my remarks to the appropriate office.

This letter encloses the answers to the questions appended to your letter of October 7, that you and other members had asked me to reply to. I hope these answers will be helpful to your deliberations.

Once again, I appreciated the opportunity to testify.

Sincerely,

Arthur W Hummel Jr

Arthur W. Hummel, Jr.

1. What should be the objectives of US negotiations with the Chinese on:

A) Technology transfer?

The key objective of a US-PRC technology transfer agreement should be to establish a regime that safeguards US satellite technology from possible misuse or diversion. Specifically, an agreement should provide for US-monitored access controls and US oversight of satellite transportation, mating/demating, pre-flight testing and preparation, and launch. It should also prohibit the disclosure of not specifically authorized technical information relating to the design, development, and operation of the equipment. Finally, it should include Chinese commitments not to transfer any of the disclosed information to third parties.

B) Fair pricing?

The main objective of a fair pricing agreement should be to protect the US launch industry from unfair trade practices and market disruption. An agreement should insure that China prices future commercial launches at international "market" rates, that China limits the number of future launches to appropriate levels, and that China participate in international "rules of the road" talks regarding government involvement in and support of the commercial launch industry.

C) Liability?

Because China is not a signatory to the 1972 Convention on International Liability for Damage Caused by Space Objects and because it may be argued that the US is procuring the launching of the satellites in question, the US possibly could be held liable for damages in the event of an accident under international law and the Liability Convention. Therefore, the chief objective of a liability agreement should be to guarantee that China will compensate the US for any and all liability for which the US may be liable under the Liability Convention or other applicable international law.

2. How important to China is their entry into the launch services market?

China places highest priority on the development of a modern, internationally competitive launch services industry. China considers aerospace a key industry for economic and technological reasons, as well as for reasons of national prestige.

What do you think their objectives are?

Over the past ten years, China has made great efforts to modernize its industry and agriculture and raise the living standards of its people. In the process, China has reformed its economy and and opened itself up to the outside world. China's immediate objectives in entering the launch services market are to earn foreign exchange and acquire experience in an important industrial technology. Over the long term, China believes that there is a bright commercial future for space technologies and hopes to participate in that growth.

3. What impact would denial of the proposed export license have?

Denial of the license would probably cost the United States $300 million in commercial exports and hundreds of jobs. Furthermore, the US would forego an opportunity to bring China into the launch services market on our terms, with protections against unfair pricing and trade practices. Denial would only temporarily delay Chinese entry into the market. It would not make our launch industry more competitive nor improve US security. Denial would strain our bilateral relationship and could cause China to switch away from the US as a source of technology imports.

4. Compare the pending decision on Long March with possible approval of a license application for the Soviet Proton.

> The two cases are very different. China does not pose the same threat to United States' space assets as does the Soviet Union. Soviet capabilities to exploit vulnerabilities in US satellites are vastly greater than those of China. Furthermore, within US foreign policy and within COCOM, we differentiate between the Soviet Union and China. We consider China to be a "friendly non-allied country" and as such give it far different treatment from the Soviet Union. An example of this is the fact that we have transfered military technology to China, a degree of cooperation that we have never approached with the Soviets.

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General Counsel
R. THOMAS WEIMER
Republican Staff Director

October 7, 1988

Mr. Richard Johnson, General Manager
AUSSAT, Ply.
c/o John McCarthy
Embassy of Australia
1601 Massachusetts Avenue, NW
Washington, DC 20036

Dear Mr. Johnson:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

Due to time constraints, Members were unable to ask you several questions for the record. I am enclosing a list of those questions; your responses will appear in the official hearing record and are greatly appreciated.

Also enclosed is your transcribed testimony for your use in correcting, for the printed record, any transcriptional or typographical errors. Please be advised that only transcriptional or typographical corrections will be accepted under Committee rules.

I would appreciate your response to these items within two weeks of receipt of this letter. Please feel free to contact Dr. Bob Palmer at (202) 226-3636 or Dr. Bill Smith at (202) 225-7858 if you require additional information.

Thank you very much for the time you have contributed, on such short notice, toward the hearing record on this important public policy issue.

Sincerely,

ROBERT A. ROE
Chairman

RAR/ls
Enclosures

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Richard Johnson, AUSSAT

1. What should be the objectives of U.S. negotiations with the Chinese on:
    a) Technology Transfer?
    b) Fair pricing for launch services?
    c) Liability for Long March launches?
2. What impact would the denial of the proposed export licenses have?
3. What factors were considered in selecting Long March as the launch vehicle for AUSSAT?

AUSSAT
AUSTRALIA'S NATIONAL SATELLITE SYSTEM

AUSSAT Pty Ltd.
Incorporated in the ACT
54 Carrington Street
Sydney 2000
G.P.O. Box 1512, Sydney 2001

OFFICE OF THE GENERAL MANAGER

18 October, 1988.

Mr. Robert A. Roe,
Chairman,
U.S. House of Representatives,
Committee on Science, Space, and Technology,
Suite 2321 Rayburn House Office Building,
WASHINGTON, DC 20515.

Dear Mr. Roe,

Thank you for your letter of October 7, 1988 regarding my testimony on September 23, 1988 before the Committee's special hearing to examine the Long March expendable launch vehicle issue. In your letter you invited me to examine the transcript of my testimony and to advise you of any corrections needed and you also enclosed for my consideration a number of additional questions.

Regarding the transcript there is one error needing correction; on page 120 line 2779 the word "pricing" should read "precedent".

Regarding the additional questions, both the questions and answers are set out below:-

1. What should be the objectives of US negotiations with the Chinese on:-

   (a) Technology Transfer

   The US should seek to ensure that the Chinese agree to abide by the appropriate conditions to prevent the transfer of any technology to which the Chinese might not yet have access. My understanding is that there is no such technology involved in the transfer of data relating to the mating of the satellite to the launch vehicle. However there would clearly need to be security arrangements under the control of the satellite supplier (Hughes) during the whole of the period for which the satellite is in China being prepared for launch. It seems to me that the required assurances should be readily available from the Chinese and that it should not be difficult for Hughes to provide the appropriate physical security.

(b) Fair Pricing for Launch Services

Once the Chinese have established themselves in the market it would be reasonable to expect them to price to cover their costs plus a margin for profit. While recognising that a true assessment of these costs may be a difficult process their own commercial self interest should, in any case, drive their price towards that of the Western launch vehicles.

(c) Liability for Long March Launches

My understanding is that the Chinese Government has not yet signed the United Nations treaty on Space Liability; accordingly there is a need for a condition on the licence which ensures that the Chinese Government as the launching state accepts liability for any third party claim arising from a launch. Such liability should extend from the time of lift-off of the rocket to the point of separation of the satellite from the rocket.

2. What impact would the denial of the proposed export licence have?

From AUSSAT's point of view denial of the proposed export licence would increase the cost of AUSSAT's second generation program by $US80m or about 20% of the cost of the total program. In those circumstances, AUSSAT would have no choice but to review the contract award.

3. What factors were considered in selecting Long March as the launch vehicle for AUSSAT?

Both pricing and technical factors were considered by AUSSAT.

In so far as pricing is concerned, as indicated above, the difference in program cost arising from use of two Long March launches rather than use of two Western launches was set out in the tender documents at being approximately $US80m. Clearly this is of very substantial importance to AUSSAT but would not be relevant if AUSSAT were not satisfied with the technical performance and reliability of the rocket. In this regard AUSSAT has undertaken substantial review of the Long March launch vehicle, based on technical inspection visits to China and on similar inspection visits by Hughes. In summary AUSSAT believes that the Long March rocket is of similar reliability to that of Western launch vehicles and will be technically capable of lifting the AUSSAT satellites to the orbit required.

Thank you again for the opportunity offered to AUSSAT by the Committee to provide testimony on this important issue.

Yours sincerely,

R.C. Johnson,
GENERAL MANAGER.

2.13/RCJ/AB

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October 7, 1988

Alan Cooper, Divisional Manager
Cable & Wireless, Plc.
c/o Steve Levy
Heron, Burchette, Ruckert & Rothwell
1025 Thomas Jefferson, NW, Suite 700
Washington, DC 20007

Dear Mr. Cooper:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

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Sincerely,

Robert A. Roe

ROBERT A. ROE
Chairman

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Enclosures

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Alan Cooper, Cable & Wireless, Plc.

1. What should be the objectives of U.S. negotiations with the Chinese on:

   a) Technology Transfer?

   b) Fair pricing for launch services?

   c) Liability for Long March launches?

2. What is the estimated service life of this re-launched WESTAR VI satellite?

   Has Hughes changed its service life estimate as a result of the initial launch and recovery of this satellite?

3. You mention in your testimony (p.6) that you expect the "TT&C" facilities would be provided by U.S. sources. What U.S. companies would be some of the likely vendors?

4. In your testimony, you say that in choosing the Long March, you are more interested in performance and reliability than "transitory price advantages." What gives you confidence in the performance and reliability on the Long March, as opposed to the U.S. ELV's and the Ariane?

5. Based on your knowledge of the worldwide market for launch services, what pricing options do you think the Chinese have in the future if they intend to be a major competitor in this business?

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Response to Supplemental Questions for Alan Cooper, Cable & Wireless, PLC

1. What should be the objectives of U.S. negotiations with the Chinese on:

   a) Technology Transfer?

   The objective should be to safeguard against inadvertent disclosure of technology to the PRC, keeping in mind the nature of the technology involved and the cost/benefit of measures designed for technology protection. In the case of WESTAR 6, the technology is nearly 15 years old thus, while the technology controlled plan should be adequate and comprehensive, it should be designed with due regard for avoiding excess cost burdens upon the commercial entities who will be involved in its implementation.

   b) Fair pricing for Long March launches?

   The pricing policy should recognize and limit promotional pricing to the first three launches. As concerns the long term objective, it should be assumed that once the PRC establishes a record of reliability, the Chinese would be inclined to charge market-level prices, recognizing their need for hard currency. To the extent that the Chinese pricing may be lower than the pricing of comparable Western launches, it should be noted that the Long March is less accurate and may offer somewhat less performance than Western launches. This comparative reduced accuracy imposes cost penalties in the form of reduced satellite life and consequent reductions in revenue expectation. In the case of WESTAR 6, the use of Long March may reduce overall earnings of the satellite by $15 Million. Thus, the $30 million price AsiaSat is paying for relaunching WESTAR 6 compares quite closely with the $42 million we have been quoted for an Ariane launcher.

c) Liability for Long March launches?

PRC should meet the internationally agreed liability assurances.

2. What is the estimated service life of this re-launched WESTAR VI satellite?

Has Hughes changed its service life estimate as a result of the initial launch and recovery of this satellite?

The estimated service life of WESTAR VI is nine (9) years when launched on Long March 3, which is approximately six to nine months less than if the launch were by a western launch vehicle. This loss of expected life is due to the lesser accuracy of the Long March 3 in comparison with other systems and the relatively northerly latitude of the launch site. Hughes has not changed its estimate as a result of the initial launch and recovery operation.

3. You mention in your testimony (p.6) that you expect the "TT&C" facilities would be provided by U.S. sources. What U.S. companies would be some of the likely vendors?

Likely U.S. sources for the TT&C facilities are Hughes, GTE and STS.

4. In your testimony, you say that in choosing the Long March, you are more interested in performance and reliability than "transitory price advantages." What gives you confidence in the performance and reliability on the Long March, as opposed to the U.S. ELV's and the Ariane?

Upon expert advice from several sources including the U.S. the Long March 3 is expected to perform with a high degree of reliability. Published statistics suggest a comparable reliability record to that of U.S. commercial systems and ARIANE.

5. Based on your knowledge of the worldwide market for launch services, what pricing options do you think the Chinese have in the future if they intend to be a major competitor in this business?

> So long as there is a shortfall in supply of launch services the Chinese favored operation ought to be to charge as much as the market will bear. In the longer term there will be increased competition and continued pressure on pricing, particularly as other suppliers emerge (e.g., Japan). China should still be expected to charge the maximum competitive price, given their need for hard currency. Moreover, new launch concepts are under development in the U.S. and elsewhere which are inherently more efficient and consequently less expensive than are current U.S., European and Chinese systems. These new systems will be a major competitive factor in regard to all existing launcher systems, including those of the U.S. Europe, and China.

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Republican Staff Director

October 7, 1988

Mr. John E. Koehler
Vice President
Space and Communications Group
Hughes Aircraft Company
1700 E. Imperial Highway
El Segundo, CA 90245

Dear Dr. Koehler:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

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Robert A. Roe

ROBERT A. ROE
Chairman

RAR/ls
Enclosures

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for John E. Koehler,
Hughes Aircraft Company

1. What should be the objectives of U.S. negotiations with the Chinese on:
   - a) Technology Transfer?
   - b) Fair pricing for launch services?
   - c) Liability for Long March launches?
2. What impact would the denial of the proposed export licenses have?
3. You competed for the AUSSAT RFP, which included the Long March launch option.
   - a) Can you explain this turnkey procurement (i.e., purchase of satellite on orbit) and how the launch portion was competed?
   - b) Why, in your view, did Long March prevail over its competitors? (Ariane, Titan, Atlas-Centaur). On basis of Cost? Schedule? Reliability? Insurance?
   - c) What implications to your company, if any, result from the turnkey approach to buying satellites?
4. If China assumes all liability under the governmental agreement to be negotiated, does that present a marketing advantage vis-a-vis U.S. companies whose liability-insurance requirements are still in the process of being established?
5. How would you view a possible U.S. governmental quota on the number of "western" Chinese launches that could be conducted annually?

HUGHES
Subsidiary of GM Hughes Electronics

JOHN E. KOEHLER Vice President

18 October 1988

The Honorable Robert A. Roe, Chairman
Committee on Science, Space, and Technology
U.S. House of Representatives
Suite 2321 Rayburn House Office Building
Washington, DC 20515

Dear Mr. Chairman:

In reply to your letter of October 7, I have prepared the following responses for the record of the hearing held on September 23 before your committee.

1. What should be the objectives of U.S. negotiations with the Chinese on:

    a) Technology Transfer?
    b) Fair pricing for launch services?
    c) Liability for Long March launches?

Answer:

As explained in my testimony, we feel that the agreements being worked out between Hughes and the Chinese establish the basic security framework required to ensure protection of satellite technology. However, we feel it will be useful to have our agreements backed up by a government-to-government arrangement that supports the limits on Chinese access to the satellite, to associated equipment, and to Hughes personnel involved in launch preparation. In addition, it would be useful to have government support for understandings on retrieval of fragments in the event of launch failure. Clearly, the U.S. Government must also have an agreement that permits its own security personnel to do the spot checking of security arrangements that Government witnesses described.

Objectives for the "fair pricing" agreement are simple to state, but may be complex to achieve. The most appropriate structure for an accord, balancing equity and efficiency considerations, would

Space and Communications Group
PO Box 92919
Los Angeles, CA 90009
(213) 648-0679

be something on the order of "anti-dumping" arrangements that forbade export sales below cost or below the price at which launches are sold domestically in China. The practical difficulty with such an objective is that of specifying the proper cost or domestic price in an economy where prices are, to some extent, products of government policy. With some thought, however, it may be possible to devise an acceptable estimate of Chinese costs or prices. (That is becoming easier as enterprises in China are directed increasingly to rely on market mechanisms.) Alternatively, an approach might be adopted, similar to one that has been used in other such cases, resting on estimates of production costs in countries at similar levels of development. A quantitative limit on the number of launches that may be sold has the advantage of simplicity, and may be the best that can actually be negotiated, but a measure establishing a price "floor" to disallow dumping would be preferable.

The objective of the negotiations on liability should be to ensure that China accepts responsibilities equivalent to those borne by U.S. as a "launching state" as defined under the terms of the Outer Space Treaty.

2) What impact would the denial of the proposed export licenses have?

Answer:

AUSSAT has not committed to any particular course of action in the event of license denial. As Richard C. Johnson, General Manager of AUSSAT testified in this same hearing, if Long March were not available to launch the Hughes satellites, his company would have to thoroughly revisit the entire satellite and launch vehicle decision. They might continue as planned, re-compete, or select another supplier without a competition. As a consequence, it is possible that all of the business, both satellite and launch could be lost to U.S. companies.

Denial would also affect future satellite procurements in which U.S. companies compete. Some foreign customers, bearing in mind the record of the U.S. Government on cases like that of Caterpillar in the Soviet Union, have become wary of the process for approving high technology exports from this country. Obviously, some orderly process for reviewing proposed high technology exports is appropriate, but it is important for it to be swift and generally predictable. Since it is widely agreed that this case involves no significant risk of technology transfer, a negative decision would be seen as resting on economic considerations. Such considerations are outside the framework of the International Trade in Arms Regulations, and if they proved to be decisive in this case the legitimacy and predictability of the U.S. review process would be further eroded.

It is not in the general interest of the country for potential export customers to come to regard doing business with U.S. companies as so troublesome and unpredictable as to be not worth the effort.

3. You competed for the AUSSAT RFP, which included the Long March launch option.

   a) Can you explain this turnkey procurement (i.e., purchase of a satellite in orbit) and how the launch portion was competed?

   b) Why, in your view, did Long March prevail over its competitors? (Ariane, Titan, Atlas-Centaur). On the basis of Cost? Schedule? Reliability? Insurance?

   c) What implications to your company, if any, result from the turnkey approach to buying satellites?

Answer:

A turnkey procurement means that the customer assumes title only after a satellite has been successfully launched into its designated orbit slot and it has been demonstrated that the satellite is operating within the performance parameters specified in the governing contract.

The customer may specify in the RFP the launch vehicle with which the satellite is to be compatible. Since the launch vehicle contracts can not be negotiated in full until after the satellite contract is finalized, customers will frequently specify a requirement for multiple launch vehicle compatibility and then later in the program direct that this be narrowed to one or two launch vehicles.

With respect to the Aussat B Contract, no irrevocable decision as to launch vehicles has been made by the customer. Instead, Aussat directed Hughes to initiate the steps required under U.S. Laws to enable Hughes to comply with the ability to offer the Long March vehicle capability as specified in the Contract.

In my view, Long March prevailed as AUSSAT's first choice because it offered an acceptable level of reliability and schedule assurance while being the lowest cost. Although the insurance arrangements are still being put into final form, at the time AUSSAT directed Hughes to negotiate with China Great Wall, it appeared that competitive insurance arrangements would also be available.

The turnkey approach to buying satellites has major implications for how we do business. In order to compete successfully, companies like Hughes will have to become expert at arranging insurance, writing launch services agreements, and evaluating and managing a range of risks that we did not have to deal with in the past. In doing so, we will probably find ourselves competing with foreign satellite builders that have special relationships with their domestic insurance, launch, and banking industries and that may also have Airbus-like ties to their governments. The competition will be difficult, but we feel we have advantages of experience and scale that should enable us to hold our own.

4. If China assumes all liability under the governmental agreement to be negotiated, does that represent a marketing advantage vis-a-vis U.S. companies whose liability insurance requirements are still in the process of being established?

Answer:

Liability for damage to property and injury of third parties caused by a launch vehicle is properly the responsibility of the launch vehicle manufacturer. While the terms of coverage by some of the U.S. launch companies may not be finalized, we have contractual relationships with some of the launch vehicle manufacturers and we are indemnified for these third party liabilities. A more open issue is the damage caused to the government facilities used for the launch operations. It is our understanding that neither the U.S. Government nor the Chinese government have agreed to a cross-waiver of subrogation arrangement similar to the one which previously existed with the STS launches. If the Long March manufacturer indemnifies Hughes for this risk, this would be an additional coverage beyond that currently being offered by the U.S. companies.

5. How would you view a possible U.S. Government quota on the number of "western" Chinese launches that could be conducted annually?

Answer:

A quota on the number of launches offered may be the only practical outcome that can be reached to provide the "level playing field" desired by the U.S. launch vehicle industry. A quota of four large Long March launches has been cited by the Chinese as a possible outcome. In the short run such a quota may serve its purpose without introducing serious distortions, but in the long run it will result in the same kind of distortions as other "set asides": e.g., potential users may maneuver to be classified as "non-western", prices of both Chinese and U.S. launches will remain higher than they would be under a more competitive arrangement, and so on. An agreement should contain a "safety valve" that would permit the Chinese to do more if, for some reason, appropriate western launchers were not available in the period required. If it is determined that a quota is the only feasible negotiating outcome, the agreement should contain language that re-opens the issue in the future to permit dealing with such problems.

During my testimony (p. 155, line 3594ff.) I promised to supply for the record details on the utilization of U.S. launch vehicles by non-U.S. satellite owners. The attached table shows the manifest for Delta (McDonnell Douglas), Atlas (General Dynamics) and Titan (Martin Marietta) as released earlier this year by the Department of Transportation. As it turns out, more than half the launches planned for U.S. vehicles on this manifest are carrying satellites that are meant to be put into service by non-U.S. entities.

I appreciate this opportunity to extend the record.

Sincerely,

John Koehler

John E. Koehler

JEK/eo

Attachment

U.S. COMMERCIAL LAUNCH MANIFEST
As of 28 June, 1988

COMPANY	PAYLOAD	CUSTOMER LAUNCH DATE
McDonnell Douglas	INSAT 1-D (Govt. of India)	3/89
Conatec	Microgravity Research	3/89*
Conatec	Microgravity Research	3/89*
General Dynamics	FLTSATCOM (U.S. Navy)	9/89
McDonnell Douglas	BSBR1 (British)	8/89
Martin Marietta	JCSAT (Japanese)	8/89+
Martin Marietta	Skynet (British)	8/89+
Martin Marietta	INTELSAT VI (International Consortium)	10/89
McDonnell Douglas	INMARSAT-2 Flt#1 (International)	12/89
Martin Marietta	INTELSAT VI (International Consortium)	2/90
McDonnell Douglas	Rosat (U.S. Government)	2/90
McDonnell Douglas	INMARSAT-2 Flt#2 (International)	3/90
General Dynamics	EUTELSAT (European)	3/90
McDonnell Douglas	PALAPA B2-R (Indonesian)	3/90

LAUNCH MANIFEST (cont'd)

COMPANY	PAYLOAD	CUSTOMER LAUNCH DATE
General Dynamics	GOES I (U.S. Government)	7/90
McDonnell Douglas	BSBR2 (British)	7/90
General Dynamics	CRRES (U.S. Government)	9/90
McDonnell Douglas	EUVE (U.S. Government)	8/91
General Dynamics	GOES J (U.S. Government)	11/91
General Dynamics	GOES K (U.S. Government)	5/92

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* Launch dates may slip to later in the year.
+ The payloads will share the same vehicle.

* * *

JEK/eo

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October 7, 1988

Mr. Rex Hollis, President
Ford Aerospace Satellite Services Corp.
Ford Aerospace and Communications Corp.
Space Systems Operation
3939 Fabian Way
Palo Alto, California 94303-9981

Dear Mr. Hollis:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

Due to time constraints, Members were unable to ask you several questions for the record. I am enclosing a list of those questions; your responses will appear in the official hearing record and are greatly appreciated.

Also enclosed is your transcribed testimony for your use in correcting, for the printed record, any transcriptional or typographical errors. Please be advised that only transcriptional or typographical corrections will be accepted under Committee rules.

I would appreciate your response to these items within two weeks of receipt of this letter. Please feel free to contact Dr. Bob Palmer at (202) 226-3636 or Dr. Bill Smith at (202) 225-7858 if you require additional information.

Thank you very much for the time you have contributed, on such short notice, toward the hearing record on this important public policy issue.

Sincerely,

Robert A. Roe

ROBERT A. ROE
Chairman

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COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Rex Hollis, Ford Aerospace & Communications Corporation

1. What should be the objectives of U.S. negotiations with the Chinese on:
    a) Technology Transfer?
    b) Fair pricing for launch services?
    c) Liability for Long March launches?
2. What impact would the denial of the proposed export licenses have?
3. You competed for the AUSSAT RFP, which included the Long March launch option.
    a) Can you explain this turnkey procurement (i.e., purchase of satellite on orbit) and how the launch portion was competed?
    b) Why, in your view, did Long March prevail over its competitors? (Ariane, Titan, Atlas-Centaur). On basis of Cost? Schedule? Reliability? Insurance?
    c) What implications to your company, if any, result from the turnkey approach to buying satellites?
4. If China assumes all liability under the governmental agreement to be negotiated, does that present a marketing advantage vis-a-vis U.S. companies whose liability insurance requirements are still in the process of being established?
5. How would you view a possible U.S. governmental quota on the number of "western" Chinese launches that could be conducted annually?

Ford Aerospace response to questions of the Committee On Science, Space, And Technology on implications of the licensing decision on the Chinese Long March launch vehicle.

__Question 1:__ **What should be the objectives of U.S. negotiations with the Chinese on:**

a) Technology Transfer?

Ford Aerospace Response

Notwithstanding the fact that the People's Republic of China (PRC) is considered a "friendly, non-aligned country," U.S. technology should be carefully safeguarded in all space related transactions if for no reason other than economic considerations. The instant issue of launch vehicles is indicative of the economic disruption that can result from politically influenced pricing, and it is logical to assume that similar problems would be faced if the PRC should develop a sophisticated capability in manufacturing spacecraft.

It is generally conceded that there is no danger of technology transfer in the exchange of interface data pertaining to AsiaSat. However, data that must be exchanged between the supplier of the launch vehicle and the spacecraft manufacturer for the current generation of satellites include extensive descriptions of electromagnetic, acoustic and dynamic interfaces, with the potential for disclosure of sensitive technology. The U.S. negotiators should ensure that procedures are in place to permit the necessary exchange of data while protecting sensitive technology.

b) Fair pricing for launch services?

Ford Aerospace Response

Ideally, the U.S. negotiators would obtain an agreement whereby the price/value of a Long March launch would be equal to that of western providers. Practically, this may be impossible to do. However, there are measurable factors that could assist in deriving an algorithm to that end. These include:

- The cost of transporting the spacecraft, equipment, and personnel to the launch site and supporting them there.

- If the manufacturer of the spacecraft must also support launches from western launch sites there is a probable requirement for duplicate ground equipment.

- The relative cost of insurance between a Long March and western launch would be a constantly changing variable and unknown at the time of launch contract signing. However, it is a factor that must be considered in determining a relative value of the launches.

In arriving at a fair price for a Long March launch, it is necessary to consider all costs associated with placing the spacecraft in orbit; otherwise, it would be possible to disguise the true price of the launch by artificially low rates for items like insurance, relaunch guarantees, ground services, or a third stage. When all costs are considered, the Long March launch should be roughly equivalent to the cost of a western launch, but in no instance more than 10% below. Negotiations should address the mechanics for arriving at the price/value comparison and disposition in those instances where prices are too low.

c) Liability for Long March launches?

Ford Aerospace Response
The objective should be to provide protection against claims for damages associated with Long March launches on a par with that available for western launches. The relative value of this protection should be a factor in determining the "fair price" of the launch.

Question 2. What impact would the denial of the proposed export licenses have?

Ford Aerospace Response
The impact on manufacturers of satellite and launch vehicles from denial of export licenses can only be determined by having knowledge of what our COCOM partners would do regarding use of Long March. If France or England should allow export of spacecraft for launch on Long March and the U.S. refuse, it would place U.S. manufacturers in an impossible competitive position for foreign domestic and international satellite and launch vehicle opportunities. If our COCOM partners should also deny use of Long March, it is likely the AUSSAT II spacecraft would be manufactured and launched by western manufactures.

Question 3. You competed for the AUSSAT RFP, which included the Long March launch option.

a) Can you explain this turnkey procurement (i.e., purchase of satellite on orbit) and how the launch portion was competed?

Ford Aerospace Response
The procurement required the spacecraft manufacturer to assume the risk associated with delivering two operational satellites on orbit, to include up to four spacecraft and launch vehicles if necessary. The compressed delivery schedule made it necessary to begin work on a third spacecraft to protect the schedule in the event of a loss. There was no operational requirement for a third satellite.

Ford Aerospace negotiated launch services agreements for launches on Ariane, Titan and Long March. Information on a suitable launch vehicle from General Dynamics was delayed, and though a quotation was received, it did not lead to a launch services agreement.

b) Why, in your view, did Long March prevail over its competitors? (Ariane, Titan, Atlas-Centaur). On basis of Cost? Schedule? Reliability? Insurance?

Ford Aerospace Response
The Long March prevailed totally on the basis of price.

c) What implications to your company, if any, result from the turnkey approach to buying satellites?

Ford Aerospace Response
It is doubtful that delivery on orbit would result in a lower price to the satellite operator, but instead could lead to reduced

competition. Individual corporations have their own philosophy pertaining to risk avoidance, and if willing to commit the assets and accept the exposure associated with on-orbit delivery, would likely insist on a significantly higher margin of profit. If a large percentage of customers should demand delivery on orbit, corporations that are adverse to risk would have to reassess their position relative to participation in that market. No such trend is anticipated, however, since the more sophisticated customers do not wish to turn over control of the launch and insurance functions to the satellite manufacturer and are aware of the cost penalty that it would entail.

Question 4. If China assumes all liability under the government agreement to be negotiated, does that present a marketing advantage vis-a-vis U.S. companies whose liability insurance requirements are still in the process of being established?

Ford Aerospace Response

The availability of liability insurance for Long March would clearly be an important asset, but it must be considered as just one of the elements in the total price/value comparison with western launches.

Question 5. How would you view a possible U.S. governmental quota on the number of "western" Chinese launches that could be conducted annually?

Ford Aerospace Response

The necessity for resorting to a quota system implies an inability to establish parity in pricing. If the Long March should remain the choice on a price/value basis, and a quota assigned, a procedure would be required to designate the winner of those contending for the low cost launches. A windfall situation could be very disruptive, and would only mitigate rather than resolve the current Long March issue.

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Republican Staff Director

October 7, 1988

Alan Lovelace, Vice President
and General Manager
Space Systems Division
General Dynamics Corporation
P.O. Box 85990
San Diego, CA 92138

Dear Dr. Lovelace: Al

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

Due to time constraints, Members were unable to ask you several questions for the record. I am enclosing a list of those questions; your responses will appear in the official hearing record and are greatly appreciated.

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Sincerely,

Many thanks
Bob

ROBERT A. ROE
Chairman

RAR/ls
Enclosures

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Alan Lovelace, General Dynamics Corporation

1. What should be the objectives of U.S. negotiations with the Chinese on:

   a) Technology Transfer?

   b) Fair pricing for launch services?

   c) Liability for Long March launches?

2. What impact would the denial of the proposed export licenses have?

3. You recommend delaying "approval" of this export license to export satellites for launch on Long March.

   a) What are the advantages of such a delay?

   b) Is the timing that would be involved in such a delay sufficient that you would feel better positioned to compete? Why or why not?

4. The Chinese have stated that prices for the Long March are initial "introductory" price offerings, similar to practices followed by Shuttle and Ariane.

   a) If this is standard marketing practice, on what basis can we object to such offerings by the Chinese?

   b) Asiasat has said that they are paying $30 million for a launch. Is this unreasonable given the additional risk that is involved?

   c) What is a fair market price for Long March? On what basis should we tolerate discounts? For risk? Performance? Reliability?

   d) Are you willing to compete with the Chinese so long as they price fairly?

5. How do you think "turnkey" procurements such as the AUSSAT competition will affect the quality and reliability of launch services?

6. What impediments do you see for structuring direct cooperative business relationships with the Chinese that would mitigate any losses due to low pricing practices by the Chinese?

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

ADDITIONAL QUESTIONS FOR A.M. LOVELACE
GENERAL DYNAMICS CORPORATION

1. What should be the objectives of U.S. negotiations with the Chinese on:

(a) Technology Transfer:

The objective in this area is to establish appropriate safeguards that will ensure, to the maximum extent feasible, that sensitive U.S. technology is not transferred to the Chinese. The Aussat satellite in question is the HS601, which represents the very latest satellite technology. This same spacecraft design was selected for the new U.S. Navy fleet communication system. The problem is not only to protect the technology in the pre-launch preparation of the satellite and during the integration on the launch vehicle, but also the electronic transmissions in the countdown and a plan for ensuring that the U.S. personnel recover the satellite in the event of a failure in the early launch phase. The high performance upper stage, also required by the Chinese as part of this license, does not lend itself well to the "ship and shoot" concept, planned for the spacecrafts, as it must become an integrated part of the Chinese launch system. This is of concern to me.

It is not the transfer of the technology of the hardware that concerns me as much as the transfer of such things as the systems engineering and management techniques that we have developed over the past thirty years. Hughes, or any other spacecraft contractor, will have strong incentives to make sure that the Long March launches are successful. It will be very difficult to control the normal close working relationship between those responsible for the launch vehicle and those responsible for the satellite.

(b) Fair Pricing

The objective is to have an agreement which will prevent possible Chinese unfair pricing or trade practices related to launch competitons.

Given the system of government that China has, it does not seem possible to determine the full costs for production and launch of the Long March as has been attempted for the Ariane. If one turns to price, it may be possible to analyze the international pricing experience to date to construct a graph similar to that shown on Figure 1. We have plotted pricing data obtained from the open literature of current western vehicles vs. performance. It shows that all fall within a rather narrow band. This indicates quite consistent dollars per pound pricing in this performance range. The USTR may be able to obtain more accurate data to construct a similar plot. If the Chinese would agree to price within this band then the price differential among the various international launch vehicles would be small.

(c) Liability

The Chinese must be willing to be a signatory to the existing international liability treaties.

2. What impact would the denial of the proposed export license have?

Such action would only occur if the PRC refuses to accept conditions that are defined by our negotiating team. The U.S. commercial launch industry would consider such action as confirmation that our government does recognize that the ELV industry is a vital part of our broad national security whose survival is of major importance. 15,000 U.S. jobs would be protected, a $500M per year industry would be assured and our trade balance would benefit.

3. You recommend delaying "approval" of this export license to export satellites for launch on Long March.

   (a) What are the advantages of such a delay?

   My recommendation was based on the fact that Congress was being asked to approve the export licenses subject to negotiating of conditions by the Executive Branch that were not defined. This is a very important and complex issue that can have far-reaching consequences. It deserves careful consideration by both the Executive and Legislative branches with appropriate consultations with the industries involved. This is what I am recommending and it will take some period of time to accomplish.

   (b) Is the timing that would be involved in such a delay sufficient that you would feel better positioned to compete? Why or why not?

   What I am suggesting may take a month, or three months, or more to accomplish. The time required is not related to our ability to compete. The conditions spelled out in the agreements most certainly are.

4. The Chinese have stated that prices for the Long March are initial "introductory" price offerings, similar to practices followed by Shuttle and Ariane.

   (a) If this is standard marketing practice, on what basis can we object to such offerings by the Chinese?

   Contrary to the Chinese statements, introductory pricing is not a standard marketing practice of the U.S. ELV industry, and has not been used. An introductory price was offered by the European Space Agency for the first flight of Ariane 4. This was the first qualification flight of a new launch vehicle. Since this flight involved greater than usual risk, a low price was offered to any spacecraft owner who cared to share in that risk. We have no quarrel with the PRC following this same precedent. This would mean, for example, that the Chinese could charge any introductory price they choose for the first Aussat B, but would charge a fair price for the second.

(b) Asiasat has said that they are paying $30 million for a launch. Is this unreasonable given the additional risk that is involved?

This price is about 70% of the pricing level of the western launch providers. It will be flown on Long March 3, which has already had a number of flights. If this level of discount was offered as the norm in the future our industry will not be able to compete.

(c) What is a fair market price for Long March? On what basis should we tolerate discounts? For risk? Performance? Reliability?

We would like to see Long March prices fall within the narrow band of dollars per pound that exists with the western launch providers. This is the only way one can compete with a non-market economy. Figure 1 illustrates the Western pricing history.

(d) Are you willing to compete with the Chinese so long as they price fairly?

Absolutely, so long as other terms and conditions, and incentives offered by the Chinese do not disrupt our market. Pricing should be made equivalent by considering the total offer - payment terms, insurance, penalties, offsets, rebates, etc.

5. How do you think "turnkey" procurements such as AUSSAT competition will affect the quality and reliability of launch services?

There will probably be no effect. It would depend on the companies involved. "Turnkey" procurements pass the risk for operational success to the spacecraft builder who in turn may ask that it be shared by the launch provider. Obviously this can only come about at some additional cost to the operator. An operator with strong technical competence, such as Intelsat or AT&T, will not favor the "turnkey" approach. They prefer to provide technical oversight of both the spacecraft and the launch vehicle. Start-up companies such as British Satellite Broadcasting may prefer a "turnkey" delivery in orbit, but this trend is not expected to extend to most major satellite operators.

6. What impediments do you see for structuring direct cooperative business relationships with the Chinese that would mitigate any losses due to low pricing practices by the Chinese?

Since quotes in the Congressional Record state that there are now 407 U.S.-China joint ventures worth more than $2.1 billion in U.S. investment, one can conclude that there are no serious impediments. The type of joint venture that might be considered between our Space Systems Division and the Chinese Ministry of Aeronautices is the use of our Centaur stage with other stages of the Long March. We would have concerns about such a relationship without extremely tight controls because if "Chinese copies" of the Centaur technology were to result, the low price that could be charged by this non-market economy could devastate our Centaur market.

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October 7, 1988

Mr. Richard E. Brackeen
President
Martin Marietta Commercial Titan, Inc.
Martin Marietta Aerospace
Box 179/Mail Stop T-500
Denver, Colorado 80201

Dear Mr. Brackeen:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

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COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Richard E. Brackeen, Martin Marietta Aerospace

1. What should be the objectives of U.S. negotiations with the Chinese on:
    a) Technology Transfer?
    b) Fair pricing for launch services?
    c) Liability for Long March launches?
2. What impact would the denial of the proposed export licenses have?
3. You recommend delaying "approval" of this export license to export satellites for launch on Long March.
    a) What are the advantages of such a delay?
    b) Is the timing that would be involved in such a delay sufficient that you would feel better positioned to compete? Why or why not?
4. The Chinese have stated that prices for the Long March are initial "introductory" price offerings, similar to practices followed by Shuttle and Ariane.
    a) If this is standard marketing practice, on what basis can we object to such offerings by the Chinese?
    b) Asiasat has said that they are paying $30 million for a launch. Is this unreasonable given the additional risk that is involved?
    c) What is a fair market price for Long March? On what basis should we tolerate discounts? For risk? Performance? Reliability?
    d) Are you willing to compete with the Chinese so long as they price fairly?
5. How do you think "turnkey" procurements such as the AUSSAT competition will affect the quality and reliability of launch services?
6. What impediments do you see for structuring direct cooperative business relationships with the Chinese that would mitigate any losses due to low pricing practices by the Chinese?

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Richard E. Brackeen
Martin Marietta Commercial Titan, Inc.

1. What should be the objectives of U.S. negotiations with the Chinese on:

(a) Technology Transfer:

The objective of any technology transfer agreement between the United States and China should be to prevent the transfer of any sensitive technologies to China. These technologies include not only satellite technologies, but also systems engineering and manufacturing knowhow.

The agreement should cover all phases of activity, such as shipment, customs processing, ground transportation to the payload processing facility, testing, arming with propellants, transportation to the launch pad, integration of the payload and the vehicle, electronic transmissions during launch, and launch failure, if any.

A separate agreement will be required to protect any U.S. upper stage required by the Chinese. The "ship and shoot" concept developed for the protection of U.S. satellite technologies will be inadequate in this case since the third stage must become an integral part of the Chinese launch vehicle.

(b) Fair Pricing for Launch Services:

The objective of any fair trade agreement with the Chinese should be to prevent "possible unfair Chinese pricing or trade practices", as stated by the Administration.

We believe that both a numerical standard and a pricing standard are required to achieve the desired result, and are working with the Office of the U.S. Trade Representative to see if satisfactory standards can be developed. At this time, industry has recommended a numerical standard of one award of one launch per year. It has recommended consideration of two approaches on pricing; the first would be based on "constructed costs" and the second on "comparative prices".

(c) Liability for Long March launches?

The Chinese must agree to hold the U.S. harmless against any claims resulting from its launches, and to become a signatory to the Liability Convention.

2. What impact would the denial of the proposed export license have?

   The denial of this specific export license would obviously impact the parties to the Long March launch contract that underlies the request. In addition, if the denial were based on a U.S. assessment that a satisfactory fair trade agreement could not be negotiated with the Chinese, it would send them a very strong message that the U.S. Government is seriously concerned about the possible adverse impact of Chinese trade practices on the U.S. ELV industry.

3. You recommend delaying "approval" of this export license to export satellites for launch on Long March.

   (a) What are the advantages of such a delay?

   We have recommended delaying approval of this export license until the three agreements discussed above have been negotiated with the Chinese. Our recommendation is based on our fear that, when these agreements are negotiated, we may conclude that they do not adequately protect our industry. If this turns out to be the case, we want to be able to present our concerns to the Congress before the license is issued and before the parties to the underlying launch contract have taken actions in reliance on the license which create equities on their part.

   (b) Is the timing that would be involved in such a delay sufficient that you would feel better positioned to compete? Why or why not?

   Our request for delay does not, in and of itself, relate to our ability to compete. The rationale underlying our request is set forth in 3(a) above.

4. The Chinese have stated that prices for the Long March are initial "introductory" price offerings, similar to practices followed by Shuttle and Ariane.

   (a) If this is standard marketing practice, on what basis can we object to such offerings by the Chinese?

   It is not standard commercial marketing practice to offer more than the initial launch of a new expendable launch vehicle at an introductory price. Such a price was recently offered by Arianespace for the first launch of the Ariane 4. All subsequent launches have been at normal pricing levels. The Shuttle practice is inapplicable here since it was a governmental, not a commercial, practice. While the U.S. industry has yet to offer an introductory price, it does support an introductory price for the qualification launch of a new expendable launch vehicle. It does not support introductory prices for Asiasat since the Long March 3 has flown several times previously. It also cannot support introductory prices for Aussat 2B, the second launch of the Long March 2E.

(b) Asiasat has said that they are paying $30 million for a launch. Is this unreasonable given the additional risk that is involved?

The price Asiasat is paying for its Long March 3 launch is 70% of the going commercial price for a payload of this size. They have argued before the Committee that their lower price is offset by substantial cost penalties involved in utilizing the Long March 3, such as their launch site latitude, launch site distance from customers, lack of a steerable third stage, and higher launch insurance premiums.

The Committee should be aware that U.S. launch sites in Florida are only one degree nearer the Equator than the Chinese launch site. Any disadvantage incurred by Chinese customers will also be incurred by our customers. Similarly, many of our customers have to transport their satellites a considerable distance to our launch site. With respect to the Chinese lack of a steerable third stage, the Chinese have told the U.S. negotiating team that they plan to use a PAM D2 manufactured by McDonnell Douglas Company as their third stage. Martin Marietta Commercial Titan, Inc. also plans to use the PAM D2 as one of its third stages. Consequently, this is no justification for a lesser price. In the case of insurance premiums, we understand that the Chinese People's Insurance Company offers competitive prices. In summary, the Chinese cannot justify a price differential on these grounds.

(c) What is a fair market price for Long March? On what basis should we tolerate discounts? For risk? Performance? Reliability?

The U.S. Trade Representative's Office is currently conducting extensive inter-agency discussions on these questions. They have asked for industry input which we are in the process of providing. At this time, it is fair to say that none of the participants in this process can answer these questions. They go to the heart of the problem presented by the entry of a non-market economy into the free world's launch services market.

(d) Are you willing to compete with the Chinese so long as they price fairly?

Yes. However, we understand that the Chinese are known to offer incentives, both directly related to the contract in question, and apparently unrelated to the contract, to encourage the development of their industry. Two examples of directly related incentives were cited by Bob Johnson, President of Dominion Video, a Florida company that recently selected the Long March to launch its two direct broadcast satellites, as influencing his launch services decision; a big saving in reduced front-end payments and a commitment from the Chinese People's Insurance Company to lock in competitive insurance rates well in advance of launch. As the Committee knows, our customers cannot lock in insurance rates until three months before launch. An example of an unrelated incentive would be the building of factories to process a key natural product in the prospective customer's country. All such incentives must be factored in to a determination as to whether the "price" charged by the Chinese is in fact "fair".

5. How do you think "turnkey" procurements such as the AUSSAT competition will affect the quality and reliability of launch services?

We do not expect that turnkey procurements will affect the quality and reliability of launch services. Rather, they are designed to re-allocate risk between the customer and the manufacturers of both satellites and launch vehicles, albeit at an increased cost to the customer.

6. What impediments do you see for structuring direct cooperative business relationships with the Chinese that would mitigate any losses due to low pricing practices by the Chinese?

Testimony before your Committee shows that many joint ventures with the Chinese are possible and, presumably, profitable. In Martin Marietta's case, we have had an office in HongKong for several years, the sole purpose of which is to explore business possibilities with the Chinese. To date, we have been unable to develop a cooperative undertaking of mutual interest. As you know, many of our products are classified and subject to technology transfer restrictions. In addition, we have found that we do not have a third stage that is cost effective for commercial use. We are thus unable to see at this time how to structure a direct cooperative business relationship with the Chinese that would mitigate any losses due to low pricing practices by the Chinese with respect to their launch vehicles.

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October 7, 1988

Robert H. Hood, Jr., Vice President
Aerospace Business Development
Mail Station H180/HQ/6N/Room 645
McDonnell Douglas Corporation
P.O. Box 516
St. Louis, MO 63166

Dear Mr. Hood:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

Due to time constraints, Members were unable to ask you several questions for the record. I am enclosing a list of those questions; your responses will appear in the official hearing record and are greatly appreciated.

Also enclosed is your transcribed testimony for your use in correcting, for the printed record, any transcriptional or typographical errors. Please be advised that only transcriptional or typographical corrections will be accepted under Committee rules.

I would appreciate your response to these items within two weeks of receipt of this letter. Please feel free to contact Dr. Bob Palmer at (202) 226-3636 or Dr. Bill Smith at (202) 225-7858 if you require additional information.

Thank you very much for the time you have contributed, on such short notice, toward the hearing record on this important public policy issue.

Sincerely,

Robert A. Roe

ROBERT A. ROE
Chairman

RAR/ls
Enclosures

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for Robert H. Hood, Jr., McDonnell Douglas Corporation

1. What should be the objectives of U.S. negotiations with the Chinese on:
   a) Technology Transfer?
   b) Fair pricing for launch services?
   c) Liability for Long March launches?
2. What impact would the denial of the proposed export licenses have?
3. The Chinese have stated that prices for the Long March are initial "introductory" price offerings, similar to practices followed by Shuttle and Ariane.
   a) If this is standard marketing practice, on what basis can we object to such offerings by the Chinese?
   b) Asiasat has said that they are paying $30 million for a launch. Is this unreasonable given the additional risk that is involved?
   c) What is a fair market price for Long March? On what basis should we tolerate discounts? For risk? Performance? Reliability?
4. How do you think "turnkey" procurements such as the AUSSAT competition will affect the quality and reliability of launch services?
5. What impediments do you see for structuring direct cooperative business relationships with the Chinese that would mitigate any losses due to low pricing practices by the Chinese?

MCDONNELL DOUGLAS
CORPORATION

ROBERT H. HOOD, JR.
VICE PRESIDENT
AEROSPACE GROUP
BUSINESS DEVELOPMENT

03 November 1988

The Honorable
Robert A. Roe
House of Representatives
Rayburn House Office Building
Suite 2321
Washington, D.C. 20515

Dear Mr. Roe:

In reference to your request of October 7, 1988, enclosed are the responses to your additional questions in connection with my testimony given on September 23, 1988.

I greatly appreciated the opportunity to express our views on this important issue. Please let me know if I can provide any further information.

Thank you.

Sincerely,

Robert H Hood Jr.

NOV 10 1988

HEARING ON IMPLICATIONS OF THE LICENSING DECISION ON LONG MARCH

Responses to Questions for Robert H. Hood, Jr.

Testimony Given on September 23, 1988

Q:

1. What should be the objectives of U.S. negotiations with the Chinese on:

   a) Technology Transfer?
   b) Fair pricing for launch services?
   c) Liability for Long March launches?

A:

a) Define security procedures to assure that the spacecraft remains in the custody and under the surveillance of the US manufacturer until launch. Obtain agreement that in case of a launch failure where the satellite is recovered, the satellite will be turned over to the manufacturer immediately and without PRC inspection.

b) Establish a launch price level for each weight class of satellite and require PRC pricing within a narrow band (5% recommended). Consider financing and insurance pricing as part of the pricing structure.

c) Require that PRC agree to the International Liability Convention terms accepting liability for damages from any accident and holding the US harmless.

Q:

2. What impact would the denial of the proposed export licenses have?

A:

Sales of Delta launch services on the international market would be enhanced without an additional government subsidized competitor emerging. Potential sales of our PAM upper stage for use on Long Match would be reduced.

Q:

3. The Chinese have stated that prices for the Long March are initial "introductory" price offerings, similar to practices followed by Shuttle and Ariane.

   a) If this is standard marketing practice, on what basis can we object to such offerings by the Chinese?

   b) Asiasat has said that they are paying $30 million for a launch. Is this unreasonable given the additional risk that is involved?

   c) What is a fair market price for Long March? On what basis should we tolerate discounts? For risk? Performance? Reliability?

A:

a) Introductory low prices have been used by the U.S. government with Shuttle and by the government-sponsored consortium Arianespace for Ariane, but this practice has not been use by U.S. ELV manufacturers who have to show profits to their stockholders.

b) We understand that the PRC is providing low cost insurance to cover this risk. This is another factor in pricing that has to be considered. Insurance availability is limited on the international market and high rates are charged with the insurance community attempting to recover past losses.

c) For the Delta class of launch service, $50M is a fair market price. Discounts for an unproven and risky product covered by low cost insurance should not be allowed. If discounts are tolerated on an introductory basis for a period of time, the reduction in the already limited market for US ELV manufacturers could drive companies starting commercial business out of the market.

Q:

4. How do you think "turnkey" procurements such as the AUSSAT competition will affect the quality and reliability of launch services?

A:

MDAC policy is to maintain the highest reliability possible for both our government and commercial customers. This has been reflected in our achieving the highest reliability record in the world over the last eleven years (97.9%) with a record of 43 consecutive successes in that period. This has been accomplished as a team effort with government oversight. We continue to be highly incentivized toward 100% success on our government programs. Our policy is to build launch vehicles under the same government oversight and specifications for our commercial customers. Therefore, we do not see any effect on quality of reliability wit a different commercial procurement method such as the AUSSAT competition.

Q:

5. What impediments do you see for structuring direct cooperative business relationships with the Chinese that would mitigate any losses due to low pricing practices by the Chinese?

A:

> MDC is currently pursuing cooperative business relationships with PRC outside of the space area. Our commercial aircraft agreements with the Chinese for co-production of the MD-80 is the largest US/PRC technology program--approximately $1 billion in value. We are also pursuing an agreement for use of our PAM upperstage family as an injection stage for Long March. The latter could, to a small extent, mitigate losses due to low price Long March impact on Delta sales. We are aggressively pursuing these and all other alternatives of mutual interest in China that we see at this time. It is difficult to postulate a scenario where we could propose a trade-off in which our Delta losses would be mitigated by new sales in another area.

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Republican Staff Director

October 7, 1988

Douglas A. Heydon, President
Arianespace, Inc.
1747 Pennsylvania Avenue, Suite 875
Washington, DC 20006

Dear Mr. Heydon:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

Due to time constraints, Members were unable to ask you several questions for the record. I am enclosing a list of those questions; your responses will appear in the official hearing record and are greatly appreciated.

Also enclosed is your transcribed testimony for your use in correcting, for the printed record, any transcriptional or typographical errors. Please be advised that only transcriptional or typographical corrections will be accepted under Committee rules.

I would appreciate your response to these items within two weeks of receipt of this letter. Please feel free to contact Dr. Bob Palmer at (202) 226-3636 or Dr. Bill Smith at (202) 225-7858 if you require additional information.

Thank you very much for the time you have contributed, on such short notice, toward the hearing record on this important public policy issue.

Sincerely,

ROBERT A. ROE
Chairman

RAR/ls
Enclosures

COMMITTEE ON SCIENCE , AND TECHNOLOGY

Hearing on Implicat the Licensing
Decision o March

September 988

Additional Questi Doug Heydon,
Arianes nc.

1. This license is conditioned upon letion of 3 agreements relat
to technology transfer, liability r pricing. What do you belie
our objectives should be with resp such an agreement.

2. You have in past testimony endors as this Committee through leg
lation (H.R. 4399, Commercial Spac h Act Amendments), the develop
ment of a western policy toward pr pricing positions of the Sov
Union and China.

   a) How should we proceed now tha directly confronted with
   the Chinese situation?

   b) Is it fair to say that Arian willing to compete with
   the Soviets and the Chinese s s they price on a fair
   basis?

3. Has the Board of Arianespace made icy decisions as a result of
China's entry into the launch mar

   a) If so, what are they?

   b) Will Ariane match China's lau es?

4. What would you consider a fair ma ce to be for the Chinese Long
March? Should discounts be allow risk? Reliability? What a

arianespace
inc.

October 24, 1988
DH 88.1082

The Honorable Robert A. Roe, Chairman
Committee on Science, Space and Technology
U.S. House of Representatives
2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

Attached you will find answers to the four additional questions enclosed with your letter of October 7, 1988. My minor comments on the transcription of my testimony were returned earlier. Thank you for the opportunity to present my initial testimony and to respond to these other questions, as well as the thoughtful enclosure of the copy of the floor debate.

The issues we have all been addressing are not simple or susceptible to easy solution. I sincerely hope that the thoughts contained in these supplementary answers are of help in determining what course the Congress may follow in this matter. Please be assured that we are ready to discuss this, or any other space transportation issue, with you and your staff at any time.

Sincerely,

Douglas A. Heydon

Douglas A. Heydon
President

DAH/wp

Arianespace, Inc. is registered with the Department of Justice, Washington, D.C. under the Foreign Agents Registration Act as an agent of Arianespace, S.A., Evry, France. This material is filed with the Department of Justice where the required registration statment is available for public inspection. Registration does not indicate approval of the contents of this document by the United States Government.

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Attachment, Page 1
Hon. Robert A. Roe
October 24, 1988

Question 1.: This license is conditioned upon the completion of 3 agreements relating to technology transfer, liability and fair pricing. What do you believe our objectives should be with respect to such an agreement?

Answers: Let me preface my answers by saying that the first two agreements are primarily of concern and interest to governments, although the issue of technology transfer may have long term consequences as noted below. The third question, while certainly of importance to governments, is of great concern and interest to commercial launch service suppliers seeking to compete in the international satellite launching market.

Technology Transfer: As a minimum, any agreement must meet the requirements of COCOM, and should take into account the concerns of all COCOM members. The improved launch capability of the Chinese, represented by the higher performance version of Long March (CZ-2E) required for the AUSSAT launches, presents a serious concern about the long-term future of western launch capability. Great care must also be exercised to avoid inadvertent transfer of useful technical or system integration and management information as part of the detailed interchange necessary for the integration, launch planning and launch operations of the satellite and the launch vehicle. A risk also remains in the event of launch failure during the portion of flight over the Chinese mainland; any debris falling to earth could compromise advanced satellite technology.

It is not unreasonable to note that the Hughes Aircraft Company, under the terms of its contract with AUSSAT, will assume a very significant level of risk and exposure; it can be expected that Hughes will endeavor, to the maximum degree possible, to ensure the success of its Long March launches. This concern may very well increase the possibility of transfer of useful technology.

Liability: The proper objective for governments that are signatories to the 1972 Liability Convention is to induce the PRC to join in the 1972 Convention as a signatory, since this action would signify, to all other signatory states, its willingness to subscribe to and abide by the international agreements in this important area of responsibility. A bilateral agreement solely between the United States and the PRC leaves unanswered many questions of possible international complications, although it is, perhaps, temporarily expedient.

Fair Pricing: The principal objective in connection with the pricing issue must be the avoidance of market disruption as a result of arbitrarily set prices. In the absence of evidence to the contrary showing true cost-based pricing by the PRC, we are presented with a case of what appears to be massive government assistance. Therefore, the definition of "fair" can probably only be arrived at through comparison with the western cost-based launch systems.

Attachment, Page 2
Hon. Robert A. Roe
October 24, 1988

Question 2: You have in past testimony endorsed, as had this Committee through legislation (H.R. 4399, Commercial Space Launch Act Amendments), the development of a western policy toward predatory pricing positions of the Soviet Union and China.

a) How should we proceed now that we are directly confronted with the Chinese situation?

b) Is it fair to say that Arianespace is willing to compete with the Soviets and the Chinese so long as they price on a fair basis?

Answers:

a) We believe the appropriate course of action is for the U.S. and Europe to continue to completion the ongoing consultations/negotiations toward formulation of "rules of the road" concerning the role of government in assisting the private sector in the launch services market and in providing launch services directly to this market. The rules can then be used as the "yardstick" by which the Chinese can be evaluated with a view to the PRC becoming a party to a truly international agreement on rules of the road.

This process will not be easy, nor can it be accomplished in a short time. Indeed, the nature of the differences between the western and PRC economies may make it impossible. We need only consider that consultations on this issue have been going on for nearly three years between Europe and the U.S., two regions with very similar economic systems and many common objectives, with progress but still no conclusive agreement. It is not reasonable to expect that an agreement involving dramatically different systems, starting from a position of virtually total lack of working information, can be reached in a matter of weeks or even months.

One possible alternative could be something along the following lines:

- o Agree to a limited quota of non-Chinese launches to be offered each year by the PRC for a strictly defined number of years, to then be terminated by institution of internationally agreed upon "rules of the road" for fair trade practice.
- o The quota should be kept very limited; one or two per year maximum.
- o The "sunset" period should also be kept quite limited, on the order of three years. This would be the "driver" to ensure that the detailed negotiations required to reach agreement on the rules of the road come to closure.
- o The time would be adequate to permit full and complete consultation with other nations, allowing a truly international consensus to be reached.

b) Arianespace is entirely willing to compete with the Chinese, as we are doing today with the U.S. ELV suppliers, on a fair and reasonable basis, which we believe can better be achieved through broadly acceptable ground rules regarding government assistance, rather than artifical government-imposed quotas and restraints. As for competition with the Soviets, that issue appears to be moot given the position taken by Western governments on export of Western satellite technology to the Soviet Union for launch.

Question 3: Has the Board of Arianespace made any policy decisions as a result of China's entry into the launch market?

a) If so, what are they?

b) Will Ariane match China's launch prices?

Answers:

a) The Board of Arianespace makes many policy decisions during its regular meetings and deliberations, dealing with the commercial activity of the company. Since the proposed issuance of export licenses by the U.S. government for launch of U.S. built satellites on the Long March is a governmental action, there is no appropriate corresponding action to be taken by the Arianespace Board other than increased awareness of the possible impact of this action on the commercial market in general and the Arianespace target market in particular. No specific action has been taken by the Board with respect to the Chinese Long March.

b) Since you raise this question directly to us, I must note that Arianespace is a commercial entity required, by business realities, to charge prices that allow it to recover its costs and operate on a profitable business basis. Given these requirements, we intend to compete for a fair share of the international satellite market. In doing so, we recognize that the interests of a commercial launch entity are not served by attempting to "match", in disregard of business realities, the artificial prices of a non-cost-based government furnished service.

Question 4: What would you consider a fair market price to be for the Chinese Long March? Should discounts be allowed? For risk? Reliability? What else?

Answer:

Without access to meaningful cost data with respect to Long March, the question of "fair market price" for the Long March can only be determined in the framework of numerous competitions, for various classes of satellite size, between free-market operators and an agreed upon set of rules of the road. In this manner, the government concerned can obtain a sense of both the "real" costs and whether or not any unfair government supports are being provided. Arianespace strongly supports the notion of

Attachment, Page 4
Hon. Robert A. Roe
October 24, 1988

multi-lateral, international agreements on rules of the road, in order to establish, with respect to the issue of government assistance, a common footing for all present and future participants in the launch services market. This may be an unrealistic goal, and it should be considered in light of my earlier answer to Question 2.a.

Discounts are a normal part of commercial business practice, usually in the context of "quantity" or "volume" price breaks (although quantities in the launch service market are never large, by usual standards). Such discounts usually take the form of slightly lower prices for orders after the first, for the same customer, with a cumulative increase as the number becomes larger. The term "discount" is not normally applied to a below cost price; the more common term for this type of pricing is "loss leader".

Risk assessment is not normally associated directly with launch pricing, but rather with the overall cost of a business plan through the risk management, or insurance, phase. Launch providers strive constantly to avoid or minimize the probability of failure ("risk"), and do not identify this factor as a discrete element of pricing. Similarly, reliability, being the converse of risk, is treated as a "good thing" in sales arguments because it will presumably result in lower overall cost to the project through lower insurance costs.

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General Counsel
R. THOMAS WEIMER
Republican Staff Director

October 7, 1988

Dr. David Scott, President
Scott Science and Technology, Inc.
39441 North 25th Street, East
Palmdale, California 93550

Dear Dr. Scott:

Thank you for your excellent testimony on Friday, September 23, 1988, before the Committee's special oversight hearing to examine the Long March expendable launch vehicle issue. The importance and timeliness of your testimony was underscored exactly one week later when the Members of the full House of Representatives debated and voted on this issue. A copy of the text from the Floor debate is enclosed for your information.

Due to time constraints, Members were unable to ask you several questions for the record. I am enclosing a list of those questions; your responses will appear in the official hearing record and are greatly appreciated.

Also enclosed is your transcribed testimony for your use in correcting, for the printed record, any transcriptional or typographical errors. Please be advised that only transcriptional or typographical corrections will be accepted under Committee rules.

I would appreciate your response to these items within two weeks of receipt of this letter. Please feel free to contact Dr. Bob Palmer at (202) 226-3636 or Dr. Bill Smith at (202) 225-7858 if you require additional information.

Thank you very much for the time you have contributed, on such short notice, toward the hearing record on this important public policy issue.

Sincerely,

ROBERT A. ROE
Chairman

RAR/ls
Enclosures

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearing on Implications of the Licensing Decision on Long March

September 23, 1988

Additional Questions for David R. Scott, Scott Science & Technology, Inc.

1. You have signed a letter of intent with Dominion Video Service to provide DBS (Direct Broadcast Satellites) service directly into American homes.

   a) Will these be the first DBS satellites in the U.S. market?

   b) If so, what has enabled Dominion to overcome the commercial and technical obstacles which have stymied earlier DBS ventures?

2. Dominion hopes to use a Chinese launch vehicle to initiate a Christian broadcasting network. Would Dominion use a Soviet launcher for the same purpose? If not, why not?

3. When does Dominion hope to apply for an export license with the State Department?

4. If Dominion is prevented from using Long March, where will they go for launch services?

SST
SCOTT SCIENCE AND TECHNOLOGY
39441 North 25th Street East, Palmdale, California 93550

805-947-8991

October 17, 1988

RECEIVED
OCT 20 1988
Committee on Science, Space and Technology

The Honorable Robert A. Roe
Chairman, Committee on Science, Space, and Technology
United States House of Representatives
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

Thank you for your letter of October 7, 1988, and for the opportunity to respond to the questions enclosed. Please consider the following:

1. Question:

You have signed a letter of intent with Dominion Video Service to provide DBS (Direct Broadcast Satellites) service directly into American homes.

a) Will these be the first DBS satellites in the U.S. market?

b) If so, what has enabled Dominion to overcome the commercial and technical obstacles which have stymied earlier DBS ventures?

Answer:

a) If launched on schedule, yes.

b) The primary obstacle to Dominion's success appears to be obtaining their final financing. However:

(1) Commercially, Dominion should benefit from the current considerable DBS activity in Europe and Japan where the cost of entry is being reduced and the markets are being expanded. As an example, seven DBS satellites with 37 DBS channels are scheduled to be launched in Europe by the end of 1989. During our recent evaluation of Dominion's opportunities, we visited a company in Europe to view the DBS consumer product in the form of a small home receiving dish slightly over one square foot in area for which the company had received firm orders for one million units; the total unit cost to include all television hook-up equipment is only $360 USD.

If Dominion is successful, the U.S. will have one DBS satellite and three channels by the end of 1989. Although the U.S. television market situation is different, the availability of small, inexpensive home receiving dishes as well as High Definition TV from satellites in Europe and Japan will very likely have a strong influence on the market situation in the U.S.

(2) Technically, we are not aware of any obstacles.

2. Question:

Dominion hopes to use a Chinese launch vehicle to initiate a Christian broadcasting network. Would Dominion use a Soviet launcher for the same purpose? If not, why not?

Answer:

In accordance with the letter of intent between Scott Science and Technology, Inc. (SST) and Dominion, SST is responsible and has the authority to select the launch vehicle to be used for the three Dominion satellites. SST will consider only the Titan, Atlas/Centaur, Delta, Ariane, and Long March. SST will not use the Proton.

3. Question:

When does Dominion hope to apply for an export license with the State Department?

Answer:

Again, in accordance with the letter of intent between SST and Dominion, SST is responsible for the preparation and submission of the applications for the export licenses for the Dominion satellites. The date for submission of such applications has not yet been determined. However, the planned date of launch of the first Dominion satellite is August, 1989, and we would anticipate submission of the first export license application as far in advance of the launch date as practical.

4. Question:

If Dominion is prevented from using Long March, where will they go for launch services?

Answer:

SST has made an extensive technical, programmatic, and economic evaluation of the launch vehicle situation worldwide. This evaluation has focused on cost, reliability, operational availability, schedule maintainability, and insurance. SST has concluded that the Long March is the only launch vehicle available for the planned August, 1989, launch of the first Dominion satellite. Based on our evaluation there are no other options available for Dominion in the time frame required by their business plan. We understand from Dominion, that if a launch is not available during 1989, they will be unable to implement their business plan.

Please let me know if we can provide any additional information; and we appreciate having had the opportunity to contribute to the Committee's understanding of the Dominion and Long March programs.

Respectfully,

David R Scott
David R. Scott
President

DRS/ma
SN/7552

cc: Mr. Robert Johnson, Dominion Video Satellite, Inc.

APPENDIX II

September, 1988

STATUS OF THE U.S./CHINA UMBRELLA S&T AGREEMENT AND THE U.S./CHINA SPACE PROTOCOL

Summary

Discussions are underway between the U.S. and China concerning re-negotiation of the five-year umbrella agreement in science and technology, which will expire within six months. The major issue currently threatening renewal of the agreement is allocation of intellectual property rights (IPR). In the space area, very little cooperation is presently occurring between the U.S. and China. The two countries have discussed a protocol in space cooperation for the past four years, but due to a variety of factors (including IPR concerns, the Challenger accident, and changes in the Chinese bureaucracy), progress has been slow.

Background

Since the first U.S./China umbrella agreement was signed in 1979, more than 500 new joint projects have been initiated under 29 different protocols (Attachment 1), and thousands of persons have been exchanged in each direction. For both the U.S. and China, the program represents the largest such arrangement with any other country. Each country has benefitted from the cooperative programs, albeit in different ways. China's benefits have been primarily in the form of enhanced training opportunities for its scientists and engineers, as well as access to advanced equipment and technology. Americans have in turn been able to carry out research in some unique areas previously closed to foreigners, have received access to extensive historical records dealing with natural phenomena such as earthquakes and floods, and have benefitted from state-of-the-art Chinese research in such areas as health and agriculture.

Re-Negotiation of the S&T Umbrella Agreement

A high-level meeting is scheduled for November, 1988, to discuss renewal of the umbrella S&T agreement, which expires on January 12, 1989. In the past two years, U.S. negotiators have become much more insistent that major provisions on IPR be included in all international S&T agreements. Such provisions were a part of the 1987 agreement with Poland, the 1988 agreement with Japan, and the 1988 agreement in transportation with the Soviet Union. OSTP, the U.S. Trade Representative, and the Commerce Department have elevated IPR as an issue in all major S&T negotiations because of the links between IPR and high-technology. OSTP argues that as much as as $60 billion/year is lost in potential U.S. exports because of the failure of other nations to protect U.S. intellectual property, and that a significant portion of this $60 billion is in the area of high-technology products.

A number of strategies have been used to increase international enforcement and awareness of IPR, including training programs by U.S. officials, trade sanctions, and termination of trade-preference benefits. Increasingly, S&T negotiations have been used as a forum for focussing on IPR issues. While disputes over IPR have yet to result in cancellation of any S&T agreements, IPR discussions have certainly slowed initiation or renewal of a number of agreements, including the potential space protocol with China. The current Administration is clearly willing to use S&T agreements as a lever to win concessions on trade and IPR disputes.

In China, where the state is the major producer and seller of goods, there are few provisions to safeguard the interests of private parties, domestic or foreign. There is also a shortage of lawyers with expertise in international patent and copyright laws. Recognizing that it would otherwise be difficult to obtain advanced technologies required for its modernization program, China enacted a new patent law in April, 1987. Although some products are protected (including the glass crystals produced in Shanghai for CERN), the provisions of the law do not provide copyright or patent protection for computer software, mask work, chemicals, or pharmaceuticals.

The U.S. transmitted proposed IPR language to China in April, 1988. Citing its lack of expertise in IPR matters, China suggested that IPR negotiations be considered separately from re-negotiation of the umbrella S&T agreement. The U.S. has rejected this option, arguing that enough time remains before expiration of the agreement to iron out the IPR issues. A team from the Office of the U.S. Trade Representative will hold discussions in China this month on the IPR issue.

What will happen if the U.S. and China can not agree on IPR language by January 12, 1989? If progress is being made with China at a satisfactory rate, the U.S. would probably agree to an interim extension of the agreement. However, if the umbrella agreement is not renewed, no new projects would begin under any of the existing protocols, and within two to three years all cooperative activity would cease. Of more immediate concern, until IPR language is agreed to by the two parties, no new protocols will be signed by the U.S., including the space protocol.

Space Protocol

Discussions between NASA and China with respect to cooperative space activities and a formal space protocol began in 1984. However, due to differences over which Chinese agency should serve as lead, serious negotiations did not get underway until January, 1986. Shortly thereafter, the Challenger accident derailed a number of possible initiatives (including discussions regarding a Chinese Shuttle mission specialist). For the past year and one-half, the protocol has been held up by delays in developing and reaching agreement on IPR language.

The space agreement would consist of a protocol and five annexes: 1) Intellectual Property Rights; 2) Solar-Terrestrial Research; 3) Space Physiology and Medicine; 4) Space Geodynamics; 5) Space Technology. NASA and the Chinese government are exchanging drafts and defining possible projects in each of these five areas, but until the IPR issue is resolved, NASA can not go forward with project planning.

It is not only IPR problems that are preventing serious U.S./China space cooperation. There are concerns in the U.S. government about significant cooperation in the area of space technology (Annex 5). In addition, any space agreement will require national security review by the interagency Committee on Intelligence (COMEX). COMEX will begin that process only after receipt of an agreed-upon text. And, of course, no text is possible until IPR language is agreed to.

China Exchange News, A Review of Educat[illegible]ce, and Academic Relations with the People's Republic of China, [illegible] 1, March 1988

ACTIVE GOVERNMENTAL AGREEMENTS IN [illegible] AND TECHNOLOGY COO[illegible]ERATION BETWEEN CHINA AND THE UNITED STAT[illegible]

Agreement/protocol	Signed	Chinese agency	US agency
Understanding on Exchange of Students and Scholars	10/78	Ministry of [illegible] National [illegible] Commission [illegible]ademy of Social [illegible]d Technology	Cooperating agencies: Dept. of Education, National Science Foundation (NSF), National Academy of Sciences, National Endowment for the Humanities
Understanding on Agricultural Exchange	11/78	Ministry of [illegible] Fisheries [illegible]usbandry, and	US Dept. of Agriculture, US Geological Survey (USGS) and Fish and Wildlife Service, both in the Dept. of Interior
Understanding on Space Technology (A protocol is currently under negotiation)	1/31/79	[illegible] [illegible]ary of [illegible]ology (Bureau [illegible]ry of	National Aeronautics and Space Administration (NASA)
Implementing Accord on Cooperation in the Field of High Energy Physics	1/31/79	[illegible]	Department of Energy
Protocol on Cooperation in the Field of Metrology and Standards	5/8/79	State Bureau [illegible]	National Bureau of Standards (Dept. of Commerce)
Protocol on Cooperation in the Field of Atmospheric Science and Technology	5/8/79	State Meteorological [illegible]n	National Oceanic and Atmospheric Administration (NOAA) & NSF
and Technical Information		Information [illegible]gy [illegible]art of SSTC	Department of Commerce
Protocol on Cooperation in the Field of Management of Industrial Science and Technology	5/79	State Economic [illegible] Education [illegible]C, Ministry of	Department of Commerce
Protocol on the Field of Marine and Fishery Science and Technology	6/8/79	National Bureau [illegible] Agriculture, [illegible] Ministry of [illegible]nd Fisheries	NOAA, NSF
Protocol on Cooperation in the Science and Technology of Medicine and Public Health	6/22/79	Ministry of [illegible]	National Institutes of Health (Dept. of Health and Human Services)
Protocol for S&T Cooperation in the Earth Sciences	1/24/80	Chinese Academy [illegible]ciences	USGS, NSF
Protocol for S&T Cooperation in Earthquake Studies	1/24/80	State Seismological [illegible]au	USGS, NSF
Protocol for S&T Cooperation in the Field of Environmental Protection	2/5/80	National [illegible] State Council [illegible]n Agency (under the	US Environmental Protection Agency
Protocol on Cooperation in the Basic Sciences	12/?/80	[illegible]	NSF
Protocol on Cooperation in the Field of Building Construction and Urban Planning Science and Technology	10/17/81	Ministry of [illegible] Environmental [illegible]nstruction and	Department of Housing and Urban Development
Protocol on Cooperation in Nuclear Safety Matters	10/17/81	National [illegible] Bureau [illegible]ction (earlier	Nuclear Regulatory Commission
Protocol on S&T Cooperation in the Study of Surface Water Hydrology	10/17/81	Bureau of [illegible] Conservancy [illegible] Water	USGS (DOI)
Cooperation in the Fields of Nuclear Physics and Controlled Magnetic Fusion Research	1/?/83	SSTC	Dept. of Energy
Cooperation in Aeronautical Science and Technology	1/?/83	Chinese [illegible] Ministry of [illegible]d	NASA
Protocol on Cooperation in Science and Technology of Transportation	1/?/83	Ministry of [illegible]	Department of Transportation
Protocol on Cooperation in Statistics	7/?/84	State Statistical [illegible]	Bureau of the Census (Dept. of Commerce)
Protocol for Scientific and Technical Cooperation in Surveying and Mapping Studies	4/?/85	National Bureau [illegible]d Mapping (SSTC)	USGS/Defense Mapping Agency
Protocol on Cooperation in the Field of Fossil Energy Research and Development	4/?/85	Ministry of [illegible]	Department of Energy
Protocol on Cooperation in Scientific and Technological Research and Laboratory Exchange in the Field of Water Resources and Related Studies	1/?/86	Ministry of [illegible] Electric Power	Corps of Engineers (Dept. of the Army)
Protocol on Cooperation in the Field of Telecommunications Science and Technology	1/?/86	Ministry of [illegible]nications	Department of Commerce
Protocol on Cooperation and Exchanges in the Field of Conservation of Nature	11/?/86	Ministry of [illegible]	Department of the Interior
Protocol on Cooperation in Railway Science and Technology	12/?/86	Ministry of [illegible]	Department of Transportation

NOTE: Since the memoranda of understanding dealing [illegible]d with basic biomedical sciences were not [illegible] at the ministerial level, China does not regard them as [illegible]s of a protocol.

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Science, Technology, and American Diplomacy - 1988, Ninth Annual Report Submitted
to the Congress by the President pursuant to Section 503(b) of Title V of Public
Law 95-426, April 1988

COUNTRY	AGENCY	SUBJECT AREA	ENTRY INTO FORCE (Y/M)	TERMINATION DATE (Y/M)	FUNDING ($ X 1000)	FOOTNOTE	REMARKS
China	Army/COE	Natural Resources	86/04	Indef			Protocol under the umbrella S&T agreement on water resources & related subjects; agreement between the US Department of the Army and the Ministry of Water Resources & Electric Power; annexes for , specific studies involving the Corps of Engineers currently being negotiated
China	BReclam	Natural Resources	84/08	87/12			Multipurpose dam development; advisory assistance in design, construction & related aspects of a high dam on the Yangtze River gorge; PRC funding of $400,000
China	DOE	Energy	79/01	89/01			Cooperation in high energy physics to include theoretical & experimental research, accelerator design & construction techniques
China	DOE	Energy (Fusion)	83/05	88/05			Cooperationl in promoting each other's program in nuclear physics & controlled magnetic fusion
China	DOE	Engergy (Fossil)	85/04	90/04			Cooperation in fossil energy R&D with emphasis on atmospheric & pressurized fluid bed combustion; surface coal gasification; coal liquifaction & enhanced oil recovery

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COUNTRY	AGENCY	SUBJECT AREA	ENTRY INTO FORCE (Y/M)	TERM-INATION DATE (Y/M)	FUNDING ($ X 1000)	FOOTNOTE	REMARKS
China	DOT	Transportation	86/12	91/12		nb	Protocol between DOT/FRA & Ministry of Railways under the umbrella S&T agreement; covers all areas of rail transportation
China	DOT	Transportation	87/01	Indef		nb	Agreement between DOT/USCG &, the Bureau of Harbor Superintendency; covers all areas of search & rescue cooperation
China	DOT	Transportation	83/05	88/05		nb	Annex I to Protocol between DOT & Ministry of Communications; cooperation between DOT/FHWA and Bureau of Highways in all areas of highway transportation
China	DOT	Transportation	83/05	88/05		nb	Protocol with the Ministry of Communications under the umbrella S&T agreement; urban systems; transport research planning; highway construction & safety; civil aviation
China	EPA	Environment	80/01	90/01			US-China Protocol on Environmental Cooperation (5-year renewals) involves five ongoing projects under two annexes on aquatic effects of environmental pollution; health research (lung cancer); modeling of air pollution transport & transformation; water pollution transport; & pollution of soil & groundwater.

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COUNTRY	AGENCY	SUBJECT AREA	ENTRY INTO FORCE (Y/M)	TERM-INATION DATE (Y/M)	FUNDING ($ X 1000)	FOOTNOTE	REMARKS
China	FWS	Natural Resources	87/01	Indef	20		Exchange of scientists to work on activities relative to endangered species
China	HHS	Biomedical Sciences	79/06	88/06			Cooperation under Health Protocol with Chinese Academy of Medical Sciences; cancer; cardiovascular diseases; infectious diseases; environmental health; human genetics; reproductive physiology; immunology; biomedical information science; child development & nutrition; public health; food & drugs; mental health
China	HHS	Biomedical Sciences	83/05	88/05			Agreement between NIH & the Chinese National Academy of Sciences on basic biomedical sciences

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COUNTRY	AGENCY	SUBJECT AREA	ENTRY INTO FORCE (Y/M)	TERMINATION DATE (Y/M)	FUNDING ($ X 1000)	FOOTNOTE	REMARKS
China	NBS	Metrology	79/01	89/05		nb	Protocol with the State Bureau of Metrology under the umbrella S&T agreement; joint studies in metrology, standards (including engineering standards), & related applied sciences; temperature, electrical, optical, length, mass, & time measurements & standards; guidelines, protocols, & standards for electronic data processing; building technology; analytical chemistry; metallic & non-metallic materials measurements & standards; applied mathematics
China	NOAA	Atmospheric Science	79/05	89/05	53		Protocol on Cooperation in Atmospheric S&T; joint meteorologic studies; training
China	NOAA	Marine Science	79/05	89/05	200		Protocol on Cooperation in the Field of Marine & Fisheries S&T; information exchange & cooperative research including TOGA; training
China	NOAA	Space Technologies	85/07	Indef			MOU for direct reception & distribution of Landsat data at Landsat ground station; extends through the life of Landsat-4 & Landsat-5

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COUNTRY	AGENCY	SUBJECT AREA	ENTRY INTO FORCE (Y/M)	TERM-INATION DATE (Y/M)	FUNDING ($ X 1000)	FOOTNOTE	REMARKS
China	NPS	Natural Resources	79/01	89/01	41		Training and exchange; US-China Cultural Accord; natural and cultural heritage; other funding of $49,000
China	NRC	Nuclear Safety	86/10	91/10		nb	Information exchange
China	NSF	Basic Sciences	80/12	91/12	1394		Protocol under S&T umbrella agreement; basic, applied, & social sciences
China	NSF	Earth Sciences	80/05	90/05	750		Protocol under S&T umbrella agreement; joint program with USGS
China	NTIS	S&T Information	84/04	89/04	25		Reciprocal exchange of S&T reporting literature & facilities relative to the use of available information systems & databases
China	US Gov	S&T Umbrella	79/01	89/01			Agreement established U.S.-PRC Joint Commission on S&T Cooperation; 29 protocols in all fields of science, technology & education; individual cooperating agencies negotiate funding with counterpart agencies
China	USDA	Agricultural Science	79/06	91/04	250		Agricultural R&D under umbrella S&T agreement; exchange of peanut germplasm; wind-break management; gypsy moth control

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COUNTRY	AGENCY	SUBJECT AREA	ENTRY INTO FORCE (Y/M)	TERM-INATION DATE (Y/M)	FUNDING ($ X 1000)	FOOTNOTE	REMARKS
China	USGS	Earth Sciences	85/01	90/12	200		Survey & Mapping Protocol; joint projects in the cartographic applications of remote sensing & in the development of geographic information systems in cooperation with the Defense Mapping Agency & National Geodetic Survey
China	USGS	Earth Sciences	80/01	90/01	130		Earth Science Protocol; PRC provides $22,000 funding; joint research on Proterozoic sediment-hosted copper deposits; mineral deposits; paleomagnetism of Proterozoic rocks; geochemical anomalies; rare-earth deposits
China	USGS	Earth Sciences	80/01	90/01	50		Surface Water Hydrology Protocol; joint research in sediment transport, hydrologic extremes, hydrologic measurement procedures, instruments & equipment; exchange of hydrologic data & analysis techniques; PRC provides funding estimated at $50,000

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COUNTRY	AGENCY	SUBJECT AREA	ENTRY INTO FORCE (Y/M)	TERM-INATION DATE (Y/M)	FUNDING ($ X 1000)	FOOTNOTE	REMARKS
China	USGS	Earth Sciences	84/07	90/01	103		Earthquake Studies Protocol; PRC provides $264,000 funding; studies on deep crustal structures in fault zones; premonitory phenomena; crustal stress measurements; seismic networks; rock mechanics; intraplate active fault studies
Colombia	HHS	Biomedical Sciences	81/01	Indef			National Library of Medicine MEDLARS Agreement with the Pan American Federation of Associations of Medical Schools; quid pro quo interlibrary exchanges
Costa Rica	USGS	Earth Sciences	86/03	87/12			Mineral resources assessment; funded by DOE at $252,000
Denmark	HHS	Biomedical Sciences	84/01	88/12			International Collaborative Effort on behalf of the National Center of Health Statistics on Perinatal & Infant Mortality
Denmark	HHS	Food Sciences	79/02	Indef			MOU; FDA recognizes certificate of analysis from government authorities on dry milk products
Denmark	NRC	Nuclear Safety	80/09	85/09		nb	Information exchange; renewal being negotiated

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gist

A quick reference aid on U.S. foreign relations
Not a comprehensive policy statement
Bureau of Public Affairs • Department of State

US-China Science and Technology Exchanges February 1988

Background: The People's Republic of China (PRC) has made science and technology (S&T) a cornerstone of its modernization drive. Since normalizing diplomatic relations in January 1979, the US and China have significantly expanded S&T contacts, and our bilateral S&T exchange program is now the largest maintained by either country.

S&T agreement: The Agreement on Cooperation in Science and Technology, signed in January 1979 during Vice Premier Deng Xiaoping's trip to the US, was extended for another 5 years in January 1984 when Premier Zhao Ziyang visited Washington. The agreement, which encompasses a wide range of scientific programs, was designed to coordinate government-to-government S&T activities and now has 29 implementing protocols and memoranda of understanding. A Joint S&T Commission, cochaired by the US Office of Science and Technology Policy and the Chinese State S&T Commission, coordinates and supervises activities under these protocols. The most recent joint commission meeting, held in Beijing in June 1987, focused on how access to and application of scientific knowledge foster economic change and development. As our cooperation has matured, a large network of contacts has developed outside the umbrella agreement.

Benefits of cooperation: Scientists, educators, administrators, and statesmen in the US and China have found programs conducted under the agreement invaluable. Productive joint exchanges include:

- Investigating the phenomenon of superconductivity, one of the most important frontier areas of scientific research today;
- Studying oceanic, atmospheric, and seismological information to advance our understanding of weather, climate, the ocean, and the earth;
- Learning how to improve the safety of nuclear reactors;
- Working to control biologically the pine caterpillar in China and the gypsy moth in the US; and
- Examining how air pollution from coal burning affects the incidence of lung cancer.

Protocol fields: The US-China S&T agreement covers exchanges in the following 29 fields. (Information on these protocols can be obtained from the indicated US Government agencies.)

1. Cooperation in Educational Exchanges: US Information Agency
2. Agriculture: Department of Agriculture
3. Space Technology: Nat'l Aeronautics and Space Administration (NASA)
4. High Energy Physics: Department of Energy (DOE)
5. Metrology and Standards: National Bureau of Standards/Department of Commerce (DOC)

6. Atmospheric Science: National Oceanic and Atmospheric Administration (NOAA)/DOC
7. Marine and Fishery Science: NOAA/DOC and National Science Foundation (NSF)
8. Medicine and Public Health: National Institutes of Health (NIH)/ Department of Health and Human Services (HHS)
9. Earthquake Studies: US Geological Survey (USGS)/Department of Interior (DOI) and NSF
10. Earth Sciences: USGS/DOI and NSF
11. Environmental Protection: Environmental Protection Agency (EPA)
12. Basic Sciences: NSF
13. Building Construction and Urban Planning: Department of Housing and Urban Development (HUD)
14. Nuclear Safety: Nuclear Regulatory Commission and DOE
15. Surface Water Hydrology: USGS/DOI
16. Nuclear Physics and Magnetic Fusion: DOE
17. Aeronautical Science and Technology: NASA
18. Transportation: Department of Transportation (DOT)
19. Management of Industrial S&T: DOC
20. Basic Biomedical Sciences Memorandum of Understanding: NIH/HHS
21. Cooperation in S&T Information: National Technical Information Service/DOC
22. Statistics: Bureau of the Census/DOC
23. Landsat Memorandum of Understanding: NOAA/DOC
24. Surveying and Mapping: USGS/DOI
25. Fossil Energy: DOE
26. Water Resources: Army Corps of Engineering/Dept. of the Army
27. Telecommunications: National Telecommunications and Information Administration/DOC
28. Nature Conservation: Fish and Wildlife Service/DOI
29. Railways: DOT

Further information: US scholars interested in applying for research and study outside the government-to-government programs may contact:

Committee on Scholarly Communication with the PRC
National Program for Advanced Study and Research in China
2101 Constitution Avenue, N.W.
Washington, D.C. 20418
(202) 334-2718

Key US Government contacts are:

Office of Cooperative S&T Programs
Department of State
Washington, D.C. 20520
(202) 647-3632

Office of Chinese and Mongolian Affairs
Department of State
Washington, D.C. 20520
(202) 647-6798

Harriet Culley, Editor (202) 647-1208

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RICHARD P. SUTTMEIER

Listening to China

China's push for high-technology development can benefit U.S. science and commerce, but only if we update our strategies for cooperation.

In the mid-1970s, when the Japanese told the world how they intended to create a high-technology future, few Americans listened. It took a major shock to the U.S. economy before we looked closely at the changes in Japanese science and technology (S&T) and began devising strategies for dealing with them. One suspects that had Americans been more attentive at the time, our current relations with Japan would be very different.

Today, the United States is in danger of repeating these mistakes in its S&T relations with the People's Republic of China. The PRC is probably too poor to be the "next Japan." Nevertheless, it has started making strides toward becoming a world-class science and technology power. The changes going on in China present the United States with opportunities for expanded trade and, in the long run, for more rewarding scientific exchanges. But through inattentiveness, the United States could easily forfeit these opportunities to foreign competitors that are more attuned to the PRC's aspirations.

Over the past decade, the United States has built up a science and technology relationship with China that has served both sides well. Under the U.S.-China Agreement on Cooperation in Science and Technology, signed in 1979, some 29 protocols have been drawn up between Chinese government ministries and such U.S. agencies as the Department of Agriculture, the National Bureau of Standards, and the Corps of Engineers. These have resulted in more than 500 projects—exchange programs, training programs, joint research, and information sharing—in a broad range of scientific and technical fields. Augmenting the government-to-government relationship are numerous agreements between U.S. and Chinese universities, as well as commercial agreements that produce some $10 billion a year in trade, much of it technology-related.

For the Chinese, S&T cooperation with the United States has meant rapid advancement. When these relations began to unfold, China was just coming out of the trauma of the Cultural Revolution; its edu-

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Richard P. Suttmeier, Henry P. Bristol Professor of International Affairs at Hamilton College, has written extensively on Chinese science and technology affairs. During 1987, he directed the Beijing Office of the National Academy of Sciences' Committee on Scholarly Communications with the PRC.

Fall 1988 / Vol. 5, No. 1

cation and R&D systems had been stagnant for a decade, its base of computers, instruments, and other research tools was out of date, and its S&T leadership consisted of aging Western-trained scientists and largely uneducated cadres. Since then, tens of thousands of Chinese students and scholars have come to U.S. universities, and liberalized export controls have significantly increased transfers of U.S. technology to China. Such access to American technology and research facilities has been instrumental in China's efforts to bring its science up to world standards.

For the United States, the benefits have been less dramatic but no less significant. In addition to enhancing our scientific knowledge in certain areas—such as medicine, agriculture, and seismology—our S&T relations with China have served key geopolitical and economic aims. The Carter administration saw closer ties with China as a way of presenting a united front against Soviet expansionism in the region; science and technology were regarded as crucial strands in our "web of relations" with China. Moreover, before normalization, Japanese and European firms enjoyed opportunities for trade with China that American firms did not; S&T cooperation has done much to help U.S. business catch up. Finally, because of its large area and population, China is a major factor in the world's food, energy, and environmental quality equation. A China able to feed itself and provide for its own energy needs, and perhaps those of others, would have a very different impact on these global balances than would a less capable China. It has thus been in the U.S. interest to aid the PRC in modernizing its agriculture and energy industries and in raising its environmental consciousness.

Despite its past successes with China, however, the United States cannot afford to rest on its laurels. It is still an admired scientific center and source of technology, but the dominance that American S&T enjoyed in China a few years ago is beginning to wane. As they make a new push toward commercial competitiveness in science and technology, the Chinese are welcoming all comers. They have discovered technologies from Europe and Japan—such as chip fabrication equipment, process control computers, and steelmaking equipment—that equal or surpass those from the United States and that are more readily available. They have also found that these same countries offer opportunities for scientific exchange on terms that are quite favorable to China, often more favorable than those offered by the United States.

Thus, as China changes, so must our S&T policies. For example, the U.S. government needs to do a better job of gathering and analyzing data on China's new S&T programs and organizations, and making this information available to business. It needs to be more visionary in its funding of joint S&T activities. It may also need to set up special institutions—heretofore lacking—for advancing U.S. scientific and commercial interests in China. Only through these and other imaginative approaches can the United States hope to retain its competitive edge in a China being courted by others.

A record of steady progress

The China we are dealing with today is not the China we were dealing with when our S&T relations began. In the past decade, close to 50,000 Chinese students and scholars have gone abroad for study. Science and technology policies have been gradually overhauled, and major reform measures have altered both the economic and the R&D systems. Perhaps more important, there has been a transformation in China's leadership in science and technology. The new heads of national science policy bodies, academic institutions, technical agencies, crucial S&T-related offices within the bureaucracy, and research institutes are younger, better educated, and often quite cosmopolitan. In addition, the 13th Party Congress, held last October, gave rise to a new national political leadership composed largely of technically educated individuals who have for many years worked on China's industrial development.

The new generation of leaders is now pushing a series of programs designed to boost China's standing as an originator of scientific research and a producer of high-tech goods. Common to all these efforts is an attempt to introduce more effective approaches to the funding of R&D and to stimulate greater mobility of technical personnel. Accordingly, China is moving away from the traditional Soviet R&D model that has had such a powerful (and often negative) effect on Chinese science since the 1950s—a model in which research is separated institutionally and geographically from production, and research centers are funded on an annual allocation basis.

Instead, China is drawing inspiration from the

R&D system of the United States. Through the founding of institutions such as the new National Science Foundation of China, it is shifting toward competitive, project-oriented funding. It is also establishing science parks and engineering research centers. In addition, it plans to open more than 50 new national laboratories during the next few years. The majority of these national labs will be sited at universities, as part of a larger effort to strengthen the research role of institutions of higher learning.

Of the many changes going on, two stand out as having particularly far-reaching implications for China's S&T competitiveness and its future relations with other countries: a national high-technology program and experimentation with new strategies for commercializing the results of R&D. The high-tech program is in the tradition of state-directed efforts to push S&T development but has a number of innovative features. The commercialization strategies—being pursued both inside and outside the government—represent a new attempt to stimulate innovation through the influence of market forces.

The policy environment of the 1980s—with its stress on "opening doors" and commercialization, and its deemphasis of defense—is making available some of China's best technical thinking to those who would exploit it.

Joining the revolution

The open-door policy has unrelentingly brought home to the Chinese the significance of the international high-tech revolution and the importance of being a part of it. When scientists deliberated in 1986 on the question of a special high-tech initiative—with the endorsement of then-premier (now Party General Secretary) Zhao Ziyang—they concluded that China could not afford *not* to have such a policy. The resulting national high-technology program was announced in 1987. At its head is State Science and Technology Commission Vice-Minister Zhu Lilan, who also directs China's new program in superconductivity.

It was agreed that China should not attempt to cover every field. Instead, the government has picked seven major technology areas that build on domestic strengths, or that are judged to be particularly important for the future:

- Biotechnology (high-yield and high-quality breeding of plants and animals, new medicines and vaccines, gene therapy, protein engineering)
- Space technology
- Information technology (intelligent computer systems, optoelectronic devices and microelectronic/optoelectronic systems integration, information acquisition and processing)
- Laser technology
- Automation (computer-integrated manufacturing systems, intelligent robots)
- Energy technology (coal-fired magnetohydrodynamics, advanced nuclear reactor technology)
- Advanced materials

The work performed in these fields—at institutions all over China—will probably involve a combination of original, innovative research and "tracking" of developments in other countries. Although the levels of funding for the entire program have not been announced, initial support for the information-technology projects is slightly more than $U.S. 16 million. Leaders of research institutes anticipate generous increases over their normal budgets from the program.

The program breaks new ground in its approach to organization and management. The multiple levels of decisionmaking required for approving projects in the past have been eliminated: researchers themselves, rather than bureaucrats, are to play the central role in grant approvals. Each of the seven main project areas has an expert committee for reviewing proposals and, under these, subcommittees in charge of specific projects. The committee members are drawn from the State Science and Technology Commission and in a few cases from the National Defense Science, Technology and Industry Commission.

The Chinese are operating on the assumption that the program will allow for international cooperation. Reportedly, there are special funds set aside for this purpose. Chinese officials recognize that commercial and national-security concerns could limit cooperation in certain technology areas, but they are especially eager to join with other nations in exporting high-tech policy and management issues.

Academy of Sciences, Inc.

Just as the national high-technology program is an attempt to direct S&T development from the top down, China's efforts to increase the commercialization of technology are designed to boost S&T from the bottom up. The Chinese have recognized the benefits that the marketplace can bring to technological development. They now see that competition and customer feedback can provide powerful inducements to technical progress, and that commercial sales provide profits that can be plowed back into research and development.

The Chinese government is putting this new awareness into practice in two basic ways. First, it is encouraging the Institutes of the Chinese Academy of Sciences to form high-technology companies that commercialize CAS research. Second, it has started to allow independent entrepreneurs to set up their own privately run firms, many of which happen to be in the area of science and technology.

The new CAS-sponsored companies encompass a wide range of technologies and products. In some cases, the underlying scientific and technical knowledge is the result of past high-priority military research. Much of the defense-related work done by CAS institutes in the past was highly classified, and thus could not have been commercialized even if there had been the incentive to do so. In contrast, the policy environment of the 1980s—with its stress on "opening doors" and commercialization, and its deemphasis of defense—is making available some of China's best technical thinking to those who would exploit it. The recently founded Da Heng Company, for instance, is organized around the Academy's six institutes of optics and fine mechanics (total staff: 10,000), which developed the Chinese military's laser-based satellite tracking system. Da Heng expects to produce a variety of optical products, including commercial lasers and optical fiber products.

One of the first CAS firms established was the Keli Company, founded three years ago by Institute of Acoustics researchers and now part of a larger organization called the Keli Group. The group has 20 research and production facilities. These employ 5,000 workers—1,000 of them university graduates (a very high proportion for a Chinese enterprise) and 3,000 of them in R&D.

Keli has a contract to develop advanced remote-sensing array processors for oil prospecting, as part of a large national project for the Petroleum Ministry. In what would once have been an unlikely turn of events, Keli won the contract competitively over the ministry's own Institute of Acoustics to produce systems that approach the standards of array processors developed in the United States (which are restricted by export controls). In addition, Keli is building a factory—with partial funding from the State Planning Commission—to produce electronic typewriters, scanners for reading Chinese characters, and high-resolution color monitors; and it is engaged in R&D on low-cost videophone technology in conjunction with British and Japanese interests.

In this latter effort, Keli exemplifies the new China's international aspirations. Many of the CAS firms incorporate ties with foreign businesses, as a means of expanding their financial backing, tapping international markets, and gaining access to foreign technology. The Institute of Zoology is engaged in a joint venture with a Hong Kong firm for the production of pesticides, and the Institute of Chemistry is working with a Thai firm to produce synthetic fibers. In the area of new materials, the San Huan Company (linked to the Institute of Physics, a center of research on rare-earth magnetic materials and rare-earth doped alloys) is cooperating with U.S. and Hong Kong investors in the establishment of a major new factory in Tianjin to produce magnetic materials for export.

Another CAS firm, Kejian, has a joint venture with the Massachusetts company Analogic for the production of phased array sector scanning systems used for clinical imaging in medical diagnoses. This has involved the transfer of some technology to China, joint research in Massachusetts, and production at a new facility in the Shekou special economic zone. Reportedly, the cost/performance ratio of this system is superior to anything on the market and has forced the company's Japanese rivals to cut prices in order to compete. Kejian is cooperating with the same firm in the production of a magnetic resonance imager. In this effort. Analogic supplies the electronics, Kejian supplies the magnets, and software development and systems engineering are done jointly. Through such arrangements, foreign partners benefit from China's relatively low production and labor costs, as well as its expertise in certain specialized areas such as magnet production.

The rise of entrepreneurship

The current reform environment has permitted enterprising Chinese to establish a variety of new firms outside the state sector. Though typically small, these *min ban* (nongovern[illegible] businesses number about 10,000. Many of th[illegible] technology-based, having been started by sc[illegible] and engineers who became disaffected with [illegible] the classical socialist institutions. A large nu[illegible] technology firms are represented by the newl[illegible]nized national Non-Governmental Science an[illegible]nology Entrepreneurs Association.

The best known, and arguably the larg[illegible] most successful, of these *min ban* companies [illegible] Beijing-based Stone (*Si Tong*) Corporation. Sto[illegible] started four years ago by Wan Runnan, a com[illegible]ware specialist at the Computer Center of CAS [illegible] loan of $3,400 from local authorities in the [illegible] suburbs in 1984. Wan and his colleagues buil[illegible]poration with total assets as of early 1988 of [illegible] million. Stone now consists of 10 companies [illegible] in computer technology and networks, office [illegible]tion, electronic devices and components, [illegible] technology service centers, and electronics [illegible] employs several hundred people in Beijing a[illegible] national sales and service network.

Stone's initial success came from sell[illegible]nese-made printers customized for use with [illegible] character software. This reliance on [illegible] hardware has continued with the introductio[illegible] first major product Stone has designed from [illegible] the MS 2400 series of multiscript electronic [illegible]ers. The hardware for these machines—spe[illegible] Stone—is made in Japan by Mitsui and ori[illegible] China. Stone then adds software, encoded on [illegible]

> *[illegible]ugh*
> *ima[illegible]ness, the*
> *U.S. [illegible]d easily*
> *forfe[illegible]ortunities*
> *to for[illegible]ompetitors*
> *[illegible] more*
> *attun[illegible]the PRC's*
> *[illegible]ions.*

a modest but well-[illegible] bly plant near Beijing's [illegible] Palace. The company [illegible] troduce an advanced PC [illegible] the Chinese market [illegible] future.

Stone has been a [illegible] the future of China's [illegible]ization of high technol[illegible] achieved conspicuous [illegible] side the state econom[illegible] bines risk taking, techn[illegible] marketing in ways the [illegible] prises have yet to [illegible] relies on the sale of imp[illegible] ware in a country where [illegible] change is hard to [illegible] tightly controlled. As a result, it has been the [illegible] controversy and official inquiry. To many [illegible] is simply a *dao ye*—loosely, a racket. But [illegible] number of forward-looking government [illegible] Stone is a symbol of what technical entrep[illegible] can do for China. It received official [illegible] early last year.

In May of this year, the *Zhonggu[illegible]* Beijing, the home of many of the new CA[illegible] CAS companies, was designated a spec[illegible] zone. It will enjoy preferential policies for [illegible]ment of high technology industries.

Implications for the United States

As demonstrated by the new push towa[illegible]cialization and international linkages, and [illegible]troduction of well-funded national proje[illegible] the country's best scientists and engin[illegible] science and technology are undergoing a [illegible]formation. It is becoming increasingly [illegible] assume that the heavy hand of Soviet-ins[illegible] practices will continue to place a lim[illegible] technical development. More and mo[illegible]pears likely to emerge as an important [illegible] areas of science and technology before the [illegible] century.

Such a China will be an increasing[illegible] partner, both for trade and for scientific [illegible] But in order for the United States to be[illegible] have to redesign its strategies to keep up [illegible] new directions. Although there are a num[illegible] diate issues affecting cooperation that must be addressed—such as the United States' concern over the protection of its intellectual property—the greatest need is for longer-term thinking. Our reassessments should include at least the following considerations:

1 Institutional asymmetry

In order for S&T cooperation to succeed, both parties must adjust to the asymmetries between their S&T institutions. As current disagreements with Japan over questions of "symmetrical access" to research facilities illustrate, national institutional differences can cause friction.

Since the late 1970s, the United States and China have made serious efforts to compensate for such disparities. Because control over science and technology in China has traditionally been centralized in Beijing, the U.S. government has largely restricted its S&T relations with China to agreements between national agencies. The Chinese government, meanwhile, has delegated much more decisionmaking power to local authorities, partly to increase opportunities for contact with the decentralized research system of the United States.

These recent changes in China's S&T institutions have made further adjustments necessary. In the first place, the devolution of power to local authorities can create as many problems for the United States as it solves. It means that relations with central authorities in Beijing carry less of a guarantee that programs will go smoothly, and that U.S. companies and agencies may have to look elsewhere to find the most suitable cooperators. Moreover, the gradual strengthening of research activities in Chinese universities might make it more desirable to approach these institutions directly instead of through CAS or the Education Commission.

The growing commercialization of R&D creates additional challenges. Many of China's new commercial activities would not normally fall within the purview of the U.S.-PRC government-to-government program or of the agreements established between American and Chinese academic institutions. And American businesses that might benefit from cooperation with the new companies are unlikely to find out about them on their own; in general, U.S. firms active in China have been more interested in selling products than in acquiring partners for technology development, and they tend to know little about the Chinese R&D system. Many of these problems could be addressed through closer communication between U.S. government, academia, and business. Joint conferences and personnel exchanges would help to ensure that each sector keeps the others abreast of developments that affect them.

2. Information

The same information-flow problems that affect our ability to adjust to China's new institutional forms constrain our S&T relations with China in general. We suffer from a kind of "blind man and elephant" syndrome, where some U.S. institutions have good exposure to one part of the Chinese S&T establishment but where the analysis and integration of these diverse perspectives are lacking. Because there is no national consensus that China's scientific and technological development is a matter of vital U.S. interest, there are no systematic efforts to learn about it. Ironically, we tried harder in the days when China was still considered an enemy.

Any effort the U.S. government might make to enhance the collection and analysis of data should be undertaken with the needs of the private sector in mind. U.S. firms do some types of information gathering themselves, such as looking at market opportunities or studying activities in their own industry. But they rarely have the resources to examine relevant *scientific* activities. Because of the historical separation of research and production, these activities are often far more advanced than one would think from looking at industry alone. Nor are many firms likely to garner all the facts about China's ambitious new high-technology program. Government should therefore take up the slack by providing business with broad-range monitoring of developments in Chinese science and with reports on China's recent technology initiatives.

Significantly, there is no publicly accessible research center in either the U.S. government or academia devoted to comprehensive studies of Chinese S&T development. Nor are there centers to train individuals in the skills the United States will need in its future S&T relations with China. Current academic programs offer training in Chinese political and economic systems and management methods. But because they fail to recognize the importance of S&T in

Chinese modernization, this area is neglected. Such was also the case with Japanese S&T. Fifteen years ago, when the establishment of research and training centers might have helped us prepare for the Japanese challenge, no one was interested. Now, of course, there are many university programs dealing with Japanese S&T, but these must constantly strain to remain current. Rather than develop information capabilities reactively in the 1990s, we should employ an anticipatory strategy today.

3. Trade promotion

To take full advantage of China's growing commercial markets for high-tech products, the United States needs to explore more effective means of linking S&T cooperation with trade promotion. Present U.S. efforts in this area are hampered by an institutional gulf between our scientific and commercial agreements with China: S&T cooperation is handled by the State Department, trade promotion by the Commerce Department. While conscientious officials in both bureaucracies try to keep in touch, there is no structural guarantee that they will. The fact remains that our considerable S&T resources are not being used as fully as they might to advance U.S. commercial interests.

The Chinese are impressed by our scientific capabilities and eagerly seek out relationships with U.S. research institutions. With better coordination between S&T and trade promotion, we could steer these same Chinese toward our products and technologies as effectively as many European countries and Japan do in their dealings with China. (West Germany, for example, accomplishes this through its Ministry of Research and Technology.) In fact, the absence of a U.S. agency that links scientific and commercial concerns in an interna-

China Looks West for Appliance Technology

by Richard F. Topping

Recent economic reforms and the implementation of a massive modernization program in China—the goal of the Seventh Five-Year Plan for 1986–1990 is to increase both agricultural and industrial production by 6.7 percent annually—have created significant opportunities for U.S. businesses. In an effort to create a presence in international markets and improve its economy and quality of life, China is seeking partnerships with U.S. companies that can help build necessary capabilities in technology, product design, manufacturing, marketing, and distribution. In return, U.S. partners stand to benefit as China emerges as a powerful global industrial force in the next several decades.

The appliance industry, in particular, is ripe with opportunities. Over the past 10 years, the Chinese have steadily improved it by purchasing product designs and turn-key production equipment from foreign nations, particularly Japan. The current plan calls for further improvement in production and modernization of appliances for export to foreign nations, as well as for distribution within China. Specific goals include increases in television set production by 22 percent and in washing machines by 36 percent. Refrigerator production is expected to see a five-fold increase.

Currently, most Chinese appliances are not designed to appeal to foreign consumer tastes and still lack the "fit and finish" quality demanded by U.S. consumers. Unacceptable differences in size, features, and colors are some of the factors that limit Chinese appliances from entering export markets. For example, the Chinese are fond of large, free-standing fans with timers and other control features—an appliance that has virtually no demand in the U.S. market because of air conditioning.

Larger appliances in general will take longer to compete with Western goods, and some may never do so. U.S.-produced washing machines and full-size refrigerators, for example, are durable, well marketed, and firmly entrenched. In addition, the costs of freighting and shipping equivalent appliances from China could far outweigh the labor savings.

Still, importation of U.S. design and production assistance could enable the Chinese to market selected appliances to Western markets within the next 3 to 5 years. Small no-frost refrigerators that are becom-

tional context may be one of the best arguments for once again considering the establishment of a Department of Science and Technology.

4. Funding

Considering the enormous potential for future returns on our investment in China, the level of resources we have committed to S&T cooperation seems remarkably low. According to one estimate, the United States has spent only $10 million to $20 million annually during the past few years on its government-to-government programs with China. Under the agreement signed by our two countries in 1979, such funding follows the principle of reciprocal cost sharing: if a scientific delegation is sent from one country to the other, or if a joint research project is set up in one of the countries, the sending side pays the international travel costs, and the receiving side pays the in-country costs. This formula has served a useful purpose. But because the Chinese government is so much poorer than our own, certain activities that might serve U.S. interests—such as setting up training programs in China—have to be forgone.

Moreover, the funding restrictions imposed on individual U.S. agencies encourages them to consider only the short-term benefits of cooperation with China. At the time our joint S&T activities began, China did not qualify for Agency for International Development (AID) programs. As a result, U.S. agencies have had to finance programs with China out of their normal budgets. They have been forced to shy away from activities that do not promise clear scientific and technical benefits to the United States or that do not support their domestic mission.

Transportation, for example, is an area of profound importance to Chinese modernization—and of

ing popular in China may appeal to the small-apartment and dormitory markets. In addition, universal electric housewares such as desk fans, vacuums, and hair dryers may penetrate the U.S. market very soon.

In considering a partnership with a Chinese appliance manufacturer, U.S. decisionmakers must first realize that a relationship will not generate immediate profits and may take a significant investment of time, personnel, and funds. But the long-term potential is substantial. It is important to note that the Japanese were in a similar state 30 years ago and have since become one of the world's leading exporters. The sheer size of the Chinese economy, coupled with new technology, low labor costs, and an untapped internal market, suggest that China could become a major world appliance producer in even less time than it took the Japanese.

At this early stage, U.S. appliance manufacturers can form strong bonds with their Chinese counterparts by helping them improve quality and gain access to Western markets through established brand names, distribution channels, and sales networks. Since most Chinese executives and managers have technical backgrounds, they generally have limited experience with marketing and sales. The "teacher/student" relationship is now crucial to the Chinese, but this association also could be extremely beneficial to U.S. partners in the future when China becomes a dominant economic force.

Experience has shown that Chinese business relationships are based on close personal friendships and mutual trust. Although these take time and patience to develop, they can be the basis of long-lasting, successful ventures. The advantage of early participation is the attainment of the "first-son"-like status on which the Chinese base so much of their culture. They have been known to favor early entrants with preferred treatment in much the same way that the first-born son in a Chinese family has traditionally held a special place.

Companies with the patience and resources to develop a long-term position in the Chinese appliance industry should begin investigating cooperative arrangements now. Drawing on the experience of other industries, U.S. companies should start with a modest investment, learn to work cooperatively with their Chinese counterparts, and allow time to build the relationship gradually.

Richard F. Topping is manager of the commercial products unit in the Center for Product Development at Arthur D. Little, Inc.

great potential for U.S. commercial sales. Yet in considering cooperative ventures, the U.S. Department of Transportation takes into account only the benefits that would accrue to itself. From this narrow perspective, China would appear to get most of the benefits. DOT has therefore been hard-pressed to justify the use of its budget for China-related matters.

Our support for Chinese S&T development has not been uniformly meager; we pay some 80 percent of the cost of educating Chinese students in the United States. Yet when U.S. efforts are compared with the activities of Japan and Europe, the funding formula to which we have been wedded seems overly rigid. In general, these countries view S&T relations with China as a sound national investment that in the long run will provide access both to good intellectual talent and to lucrative commercial markets. With special budgets for international cooperation, they can pursue targets of opportunity that U.S. agencies cannot: West Germany, for instance, is helping to support a major cell biology laboratory in Shanghai, and France is contributing to a new center for robotics in Shenyang.

In addition, the absence of concessionary financing for commercial activities places U.S. companies at a serious disadvantage. Japanese and European firms can obtain financing that enables them to offer China soft loans with which to buy their products. Because the Chinese are short of hard currency, access to attractive financing often determines whether a sale is made or not. Under the Reagan administration, however, such financing has not been readily available to American business.

Given the current U.S. budget deficit, this situation is not likely to improve any time soon. And while an AID program for China is now technically possible, the political climate in Congress is not favorable. Nevertheless, it ought to be possible for the United States to adopt a sense of enlightened self-interest in funding programs with China. We should start thinking about our support for China's technical development more explicitly in investment terms, based on expectations of future scientific and technological returns and precommercial benefits. In particular, the time may have come for establishing a Sino-American Foundation for S&T Cooperation—funded by U.S. government and business, perhaps with Chinese contributions—to support the kinds of efforts that now fall between the cracks.

5. Multilateralism

China is increasingly forging technological relations with other Asian countries with which the United States also has close ties. The more this happens, the more it is in the interests of U.S. business and government to consider their relations with the PRC in a larger, multilateral context. For businesses, this may mean integrating China into the rest of their Pacific Basin operations. Multinational corporations are finding that for certain types of products it is not always feasible to centralize R&D and other services back home. China is ideally situated for servicing U.S. firms' other Asian markets—say, by writing software and customizing or maintaining equipment.

The U.S. government, too, needs to start thinking multilaterally. Of late, there has been intense interest in government/government S&T relations with Japan, a bilateral relationship clearly of great importance. But as more and more countries in the region identify common interests and enter into scientific agreements, our preoccupation with bilateralism is beginning to appear shortsighted.

The United States should also consider ways to integrate China into its multilateral S&T relations with less developed countries. China continues to think of itself as part of the Third World and actively supports such international S&T development efforts as the Third World Academy of Sciences. The United States might therefore work with China to turn one or more of that country's research establishments into an international center of excellence that would bring scientists from developed and less developed nations into regular contact.

Conflicting trends

Whatever adjustments the United States makes in its S&T strategies, there is likely to be conflict between the need to protect our interests in China and issues of competitiveness and national security. On the one hand, new Chinese leadership and initiatives are increasing the possibilities for mutually beneficial scientific cooperation and trade agreements. And the strong European and Japanese presence in China means that we will have to redouble our efforts there if we want to retain an edge.

On the other hand, our international S&T relations as a whole are coming under increasing government scrutiny. In negotiations for the renewal of the

S&T agreement with Japan, the Reagan administration has put great pressure on the Japanese to make their research system more accessible to Americans, thereby equalizing the flow of benefits from our S&T relations. In Congress, meanwhile, legislation has been introduced that would give the Defense Department veto power over partnership agreements.

Thus, it is possible that concerns over competitiveness and national security will lead the government to question an S&T relationship from which China appears to receive most of the benefits. Instead of bringing the two countries closer together, S&T could become a source of friction. To prevent this from happening, we should focus our attention on the long-term benefits that our investment in China's technical development can provide. More important, we should take steps now to ensure that the full potential of our relationship with China will be realized in the years to come.

Recommended reading

Toufiq A. Siddiqi, Jin Xiaoming, and Shi Minghao, "Joint Study of U.S.-China Government S&P Protocols," *China Exchange News* 16, no. 1 (March 1988).

Richard P. Suttmeier, "Academic Exchanges: Values and Expectations in Science and Engineering," in *Educational Exchanges: Essays on the Sino-American Experience*, Joyce K. Kallgren and Denis Fred Simon (eds.). Berkeley, Calif.: Institute of East Asian Studies, University of California, Berkeley, RPPS 21, 1987.

Richard P. Suttmeier, "Overview: Science and Technology Under Reform," *China's Economy Looks Towards the Year 2000*, Vol. 2. Joint Economic Committee, U.S. Congress, Washington, D.C.: U.S. Government Printing Office, 1986.

Provided by Department
of Commerce

SINO-US EQUITY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
AMAEE Holding Corp.	Shanghai Offshore Petroleum Engineering Corp.	Shanghai	Supplying offshore oil services	1983.8	operational but not very active
American International Group	Light Industrial Corp. (LICO)	Beijing	arranging manufacturing JVs for MNCs, product sourcing & distribution	1986.5	operational, received business license 9/86
American J.W. Specialty Co.	Shanghai Baoshan Feather Products Co. Ltd.	Shanghai	feather products	1986.7-8	NA
American Motors Corp.	Beijing Jeep Corp. Ltd.	Beijing	manufacturing jeeps and related components	1983.6	operational
American Phoenix Apparel Co.	Beijing Montpelier Apparel Ltd.	Beijing	Processing suit, etc.	1985.8	NA
American Standard Inc.	Hua-Mei Sanitary Ware Industrial Co. Ltd.	Guangdong	manufacturing bathroom plumbing fixtures	1985.6 (S)	under construction, expected startup mid-87, waiting for loan guarentee
Analogic Corp.	Analogic Scientific Inc.	Guangdong	assembling scientific instruments	1986.6	completing construction
Atlantic International Co.	Huamei Taxi Co.	Beijing	taxi service	1984.10	NA
Atlantic International Co.	Longda Stone Material Development Co.	Heilongjiang	Exploiting stone material	1985.8	NA
Atlantic Ocean International Co.	Sanyou Atlantic Ocean Indsutrial Co.	Guangdong	manufacturing double-layer aluminium foil & plastic bags for packing	1985.12	NA
Avian Farms International Inc.	Beijing Poultry Breeding Company Ltd.	Beijing	chicken breeding	1986.4	under construction, expected operational mid-87
B + F Sales Corp.	Fofei Data Aquisition & Control Ltd.	Guangdong	providing computer hardware repair & software design, selling US comp.s products in China etc.	1985.10 (S)	operational
Babcock and Wilcox	Babcock & Wilcox Beijing Co. Ltd.	Beijing	production of industrial and power station boilers	1985.10 (S)	operational
Baker Marine Corp.	China Nanhai-Baker Drilling Corp. Ltd.	Guangdong	Building drill rigs, providing drilling services	1983.4	"inactive and about to be liquidated" due to poor market for oil & gas
Beatrice Foods Co.	Beatrice-CITIC Development Co. Inc.	Beijing	food processing, light industrial products	1985.10	operational, conducted 5 feasibility studies,considering 2 JV possibilities
Beatrice Foods Co.	Guangmei Food Co. Ltd.	Guangdong	packaging soft drinks, fruits, vegetables, ice cream & snack foods	1982.2	operational, full scale production began in 2/85

SINO-US EQUITY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
Bechtel China Inc.	China-American International Engineering Co.	Beijing	jointly bidding on engineering & Construction projects	1984.10	operational
Beloit Corp.	Xi-Be Roll Covering Co.	Shaanxi	producing rubber covered rolls & synthetic roll covers used to produce paper	1984, early	operational
Bishop Graphics Inc.	Wintor Design Co. Ltd.	Guangdong	manufacturing drafting aids for printed circuit boards	1983.8	operational
Briggs & Stratton Inc.	Puling-Briggs & Stratton Engine Co. Ltd.	Sichuan	producing gasoline engines from imported kits	1986.10	received business license, haven't yet broken ground, expected operational
Brown & Root International Inc.	China Brown & Root Marine Project Co. Ltd.	Beijing	manufacturing offshore oil development platforms	1983.4	operational, seeking opportunities to bid on platform construction projects
CM2 Inc.	Shanghai Oceanroutes Ltd.	Shanghai	ocean meteorological navigation and technical advice	1985.11	NA
CW Communications/Inc.	China Computer World Publishing & Service Co.	Beijing	publishing China Computer World (weekly) & China Computer Monthly	1980.10	operational
Captive Air Inc.	Tai Ping Co.	Guangdong	manufacturing bicycle & wheel chair tires	1986.3 (S)	NA
Cardio-Pace Medical Inc.	Qinling Medical Company	Shaanxi	manufacturing pacemakers	1985.12	construction completed 10/86, expect to open 1/87
Carrier China Ltd.	Shanghai Tong Hui-Carrier Air Conditioning Equipment Co. Ltd.	Shanghai	producing air side equipment for air conditioning systems	NA	NA
Celanese Fibers Operations Ltd.	Nantong Cellulose Fibers Co. Ltd.	Jiangsu	producing cigarette filters	NA	final contract signing "imminent" as of 12/86, no MOFERT approval yet
Chaved International Investments Co. Ltd.	Amoy Microwave Co. Ltd.	Fujian	manufacturing TV transmission satellite equipment	1984.8	NA
China Development Co. Ltd.	Bedis Electronics Co. Inc.	Anhui	producing metal film resistors	1984.12	NA
China Interocean Transport Inc.	Jinhua International Marine Shipping Co.	Tianjin	freighter services	1984.12	NA
China Trading Center of New York	Swan Taxi Co.	Heilongjiang	taxi services	1984.12	NA
China-American Enterprise Co. of California	Beilian Electronics Appliances Co. Ltd.	Guangdong	electric and electronic products	1984.9	NA
Christian Doris Inc.	Jinzhu Hotel	Guizhou	building hotel & operating taxi fleet	1984.11	NA

SINO-US EQUITY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
Christian Doris Inc.	Perma Company	Guizhou	NA	1984.9	NA
Chronar Corp.	Haerbin Chronar Solar Energy Electricity Co.	Heilongjiang	building photovoltaic panel production facility	1986.6	recently approved by MFT
Continental Grain Co.	Wuhan Hua Mei Feed Mill Co. Ltd.	Hubei	producing animal feed, establishing a pig breeding farm	1986.6 (S)	under construction, expected complete by end of 1987
Core Laboratories International Ltd.	Nanhai Core Lab Ltd.	Guangdong	operate special core analysis, reservoir fluids, biostrat petrology & geochemical laboratories	1984.4	operational, performing core analysis for foreign co.s' offshore drilling
Corning Investment Corp.	Sino-American Glass Engineering Co.	Beijing	working on two glass engineering projects in Shijiazhuang & one in Xian	1986.8 (S)	awaiting MOFERT approval
Corning Investment Corp.	Shanghai Corning Engineering Corp.	Shanghai	design, manufacture & sales of glass products	1985.8	operational
DRV Corp.	DRV Sino-American Communications Co. Ltd.	Beijing	manufacturing & selling beepers	1985.6	NA
DYR Worldwide Inc.	DYR Advertising Co. Ltd.	Beijing	advertising for foreign products to be sold in China	1986.5	operational
Domes Inc.	Liulang 180 degrees Cinepanoramic Cinema	Zhejiang	180 degrees of full view movie and TV, tea house	1984.12	NA
Domes Inc.	Yuhai Cinepanoramic Cinema	Shaanxi	cinepanoramic cinema	1984.12	NA
Dresser-Atlas	China Petroleum Logging-Dresser Atlas Cooperation Service Co. Ltd.	Guangdong	providing well logging services for offshore oil exploration	1981.4	operational, currently working on contracts
Dresser-Magobar	China Nanhai-Dresser Magobar Drilling Mud Corp. Ltd.	Guangdong	oil drilling services	1984.9 (S)	operational, currently working on contract
E-S Pacific Development & Construction Co. Ltd.	Beijing Great Wall Hotel Co.	Beijing	construction of tourist hotel	1980.4	operational
E.R. Squibb & Sons Inc.	Sino-American Shanghai Squibb Pharmaceuticals Ltd.	Shanghai	producing neomycin and anti-inflammation cream	1982.5	operational, construction completed 10/85
ELK Telecommunications Inc.	ELK-CCC Fiber Optic Telecom Corp.	Hunan	Producing fiber optics equipment	1985.3 (S)	arranging financing, construction not yet underway, business license 11/85
Eastern Computers Inc.	Sino-American Eatern Computer Corp.	Fujian	Chinese language computers	1985.5	NA
Eastman-Christensen Co.	Shuanshi-Christensen Diamond Bit Co. Ltd.	Sichuan	manufacturing diamond bits	1986.12	preparing for construction of facilities, planned operational 9/87
Esso Petroleum (China) Corp. Ltd.	Esso-Shenzhen Oil Corp. Ltd.	Guangdong	NA	1983.10	NA

SINO-US EQUITY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
Federal Hotel Co.	Meido Hotel Hangzhou	Zhejiang	240 room hotel	1986.8	NA
First Interstate Bank of California	China International Nonferrous Metals Leasing Co. Ltd.	Beijing	non-ferrous metals related international leasing	1985.2	operational
Flexible Metals Hose Co.	Flexible Tiger Metal Bellows Ltd.	Liaoning	producing metal bellows extension joints, hose	1986.8	expected operational 7/87
Florasynth Inc.	Shanghai Cosfra Co. Ltd.	Shanghai	producing flavors & fragrances	1982.12	operational
Fluor China Technology Inc.	Intercontinental Engineering Inc.	Beijing	Designing non-ferrous metal projects	1985.7 (S)	NA
Fluor China Technology Inc.	Sino-Fluor Engineering Co.	Beijing	Design services for petrochemical projects	1985.8 (S)	operational
Foxboro Co.	Shanghai-Foxboro Co.	Shanghai	manufacturing electronic process control instruments	1982.8	operational
GATX leasing Corp.	Tianjin International Leasing Co. Ltd.	Tianjin	international leasing	1986.8	operational
General Foods Corp.	Guangtong Foods Co. Ltd.	Guangdong	producing soluble coffee & other products	1984	under construction, expected completion: 1st half '87
General Foods Corp.	Dong Mei Food Company Ltd.	Guangdong	producing tapioca starch	1983.3	operational, went into production in late '84
General Foods Corp.	Tian Mei Food Co. Ltd.	Tianjin	producing Tang instant breakfast drink, packaging soluble coffee	1984.11	under construction, plan completion 3rd quarter '86, prod'n early '87
General Railway Signal Co.	CASCO Signal Co. Ltd.	Shanghai	introducing railway signalling technology & manufacturing methods	1985.12 (S)	operational
Genisco Computer Corp.	Genisco-China Computer Graphics Corp.	Hunan	manufacture computer products	1984.11	training Chinese in US, construction to begin 2nd half '87, prod'n in '88
Gillette Co.	Shenmei Daily Use Products Co. Ltd.	Liaoning	producing razor blades and razors	1981.12	operational
Global Investment Corp.	Nantong Basheng First United Corp.	Jiangsu	manufactring woolen sweaters, etc.	1985.9	NA
Golden East Co.	Qiaofa Fast Printing Service Corp.	Tianjin	fast printing services	1984.2	NA
Golf Investment Co.	Dalian Lian-Fu 3-D Printing Co. Ltd.	Liaoning	Producing color relief printing materials	1985.11	NA
Guaojie Fruit & Vegatable Producing Center (HK)	Cultivating Fruit and Vegetable Co.	Guangdong	40 green houses	1983.3	NA
H.H. International Co.	Qiao Tai Plastics Factory	Fujian	manufacturing various plastic products	1985.7	NA
H.J. Heinz Co.	Heintz UFE Ltd.	Guangdong	To produce high-nutrition baby food	1984.8	operational

SINO-US EQUITY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
Harold Jewelry Inc.	General Jewelry (Shanghai) Co. Ltd.	Shanghai	jewelry processing	1986.7-8	NA
Hewlett-Packard Co.	China Hewlett-Packard Co. Ltd.	Beijing	manufacture & market electronic measuring & survey instruments	1984.8 (S)	operational
Holiday Inn International Ltd.	Tian An Hotels International Ltd.	Beijing	hotel management	NA	operational
Hua Shak Co. Inc.	Three Friends Shoe Manufacturing Co. Ltd.	Tianjin	producing rubber & leather shoes, primarily for women	1985.12	operational according to Hua Shak, TEDA: construction not yet begun
Information & Computing Technology Inc.	Huaxia-ICT Information Systems Inc.	Beijing	Developing Computer technology	1985.4	NA
Interkiln Corp	Taishan Ceramics Co. Ltd.	Shanghai	producing wall & floor tiles	1986.1	NA
Interkiln Corp.	China Ceramics Co. Ltd.	Fujian	producing and selling high grade porcelain	1984.8	NA
International Hydron Corp.	Shanghai-Hydron Contact Lens Corp.	Shanghai	processing and selling contact lenses	1985.10	operational
International Hydron Corp.	Tongji Joint Development Corp. Ltd.	Hubei	manufacture soft contact lenses	1985.9	expected operational in 2/87
International Nabisco Brands Inc.	Yili-Nabisco Biscuit Food Co.	Beijing	Producing crackers	1984.12	under construction, expected start-up early '87, equipment 70% installed
Jacnel N.Y. Corp.	Jac-Chang Metal Press & Cannery Manufacturer	Zhejiang	metal press & cannery manufacturing	1986.7	NA
Kowin-Simonds Inc.	Beijing Kowin Simonds Steel File Co. Ltd.	Beijing	Producing variety of files	1985.8	operational
Lee's Co. of Massachusetts	Intercontinental Leather Joint Venture Co.	Ningxia	producing sheepskin & fur garments	1984.12	NA
Leeco Diagnostics Inc.	Tianjin Leeco Biotechnological & Medical Products Inc.	Tianjin	testing kits for anti-bodies & other medical products	1986.2	completing construction, expected operational 1/87
Lizin International Inc.	China New Century Software Development Center	Jiangsu	software and minicomputer development	1985.1	NA
Louis Berger International Inc.	CMEC-LBI Joint Engineering Consultants Inc.	Beijing	Computer software design and engineering consulting for rural road construction	1984.11	operational
Lummus Industries Inc.	Lummus-Hubei Machinery Co. Ltd.	Hubei	producing cotton gins and parts	1984.10	operational
Lummus-Crest Inc.	Hua-Lu Engineering Co. Ltd.	Beijing	refinery & petrochemical project engineering & procurement services	1986.8	operational
Lynch Communication Systems Inc.	Yunlin Communications Systems Co. Ltd.	Yunnan	initially manufacturing 200 sets of user carrier systems	1985.12	NA

SINO-US EQUITY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
M.W. Kellogg Co.	Sino-Kellogg Engineering Co.	Gansu	engineering & construction services -- particularly in petroleum & petroleum refining	1985.5 (S)	operational, presently working on two contracts
MCP-Ball International Ltd.	Guangzhou M.C. Packaging Co. Ltd.	Guangdong	design and construct plant to produce cans and can ends	1985.3 (S)	operational
MILIEU Information Service	Ning-Jia Agricultural & Environmental Instruments Co.	Ningxia	manufacturing and selling agricultural and enviornmental instruments	1984.10	NA
Mantan Corp. Ltd.	Shanghai Mantan United Industrial Corp.	Shanghai	manufacturing nylon zippers	1985.5	NA
Mar Vista International Corp.	Jiangsu Mar Vista Plastics Co.	Jiangsu	manufacturing printed board brick and decorative board	1985.10	NA
Mar Vista International Corp.	Kuerle Sweetpear Development Co. Ltd.	Xinjiang	sweetpear cultivation	1985.10	NA
Mar Vista International Corp.	Mar Vista Paper-Making Co. Ltd.	Hunan	manufacturing sanitary napkins	1984.12	NA
Mar Vista International Corp.	Ningxiang Plastic Co. Ltd.	Hunan	producing plastic curtain	1984.11	NA
Mountain Oak Corporation of the United States	Hyland (Hailun) Hotel	Shanghai	building & operating hotel	1985.10	NA
NCH Co.	NCH Huayang Co. Ltd	Liaoning	producing sperial chemical industrial products	1986.1	operational, low level of activity as raw material search continues
New Way Food Co.	Tianjin-New Way Food Co. Ltd.	Tianjin	processing farm products & other specialty foods	1986.2	moving facilities from elsewhere in Tianjin, expected operational by 1987
OMI International Corp.	Hua Mei Electroplating Technology Co. Ltd.	Guangdong	producing chemical additives for electroplating	1983.4	operational, construction completed in late '84
Orlando Helicopters Airways Inc.	Guangzhou-Orlando Helicopter Ltd.	Guangdong	Manufacture and repair S-76 12-seat helicopters for domestic sales & export	1985.10 (S)	construction 95% complete as of 10/86
Otis Elevator Co. Ltd.	Tianjin Otis Elevator Co. Ltd.	Tianjin	selling and manufacturing elevators	1982.12	operational
Pacific ARC Corp.	Tianjin-Pai Furniture Co. Ltd.	Tianjin	producing oak furniture	1984.10	NA
Pacific Group Development Co. Ltd.	Jiangyang Rubber and Plastic Tubes Ltd	Heilongjiang	Processing plastic and rubber tubes	1985.12	NA
Pacific International Corp.	China Great Wall Color Photo Co. Ltd.	Beijing	Color photography	1983.5	NA
Pacific-Atlantic Trading Co.	Zhaoqing Pabst Brewery	Guangdong	setting up & operating 80,000 TPY brewery	1986.10	expect plant operational by early '87
Parker-Hannifin Corp.	Parker-Hubei Seals Co. Ltd.	Hubei	producing rubber seals	1981.12	operational

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SINO-US EQUITY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
Pig Improvement Co.	HUPIC Co. Ltd.	Hubei	swine breeding	1986.8	under costruction as of 9/86
Pittsburgh Plate Glass Industries Inc.	Guangdong Float Glass Co.	Guangdong	producing plate glass, chemicals & coatings	NA	broke grounc 4/85
Plenux International Co.	Sichuan Congcheng-Plenux Silk Co. Ltd.	Sichuan	producing silk	1985.11	NA
Polymold Tool & Engineering Corp.	Polymold-Jiaotong Corp.	Shanghai	producing tools and dies	1985.8	operational
Power-Pac Mikulec Industries Inc.	Tianjin Power-Pak Fire Extinguisher Co.	Tianjin	manufacturing dry chemical powder extinguishers	1985.3	NA
Promega Corp.	Sino-American Biotechnology Co.	Henan	producing reagents for use in genetic engineering	1984.6	operational
R.J. Reynolds Tobacco International Inc.	Hua-Mei Company	Fujian	manufacturing cigarettes	1985.7	under construction
Radio Engineering Corp.	Beijing Automation Scientific Development Co. Ltd.	Beijing	Producing computer intellelectronic instruments	1985.5	NA
Ranger International Inc.	Tianjin Tianlong Tractor Factory	Tianjin	manufacturing two wheel tractors	1986.11	contract approved but construction not yet underway
Raymond Offshore Constructors Inc.	China Nanhai Raymond Wah-Chang Fabricators Ltd.	Guangdong	build jackets for oil rigs	1984.4	NA
Reading & Bates Co.	China Nanhai-Reeding and Bates Drilling Co. Ltd.	Guangdong	offshore oil drilling services: chartering semi-submersible rigs	1984.10	alive but inactive
Ronald Hsu Construction Co. Inc.	Hangzhou International Construction Management Co. Ltd.	Zhejiang	construction management	1985.8	NA
Ronald Hsu Construction Inc.	Shanghai International Construction Management Co. Ltd.	Shanghai	Construction contracts	1985.5	NA
Sand Livestock Co.	Guang Sand Pc Piggery Farm Ltd.	Guangdong	producing lean pork	NA	operational
Sasnett Fishing Tools Inc.	China Nanhai Petroleum Fishing Tool Service Co. Ltd.	Guangdong	contracting fishing tools for oil drilling	1984.7	NA
Schlumberger Technology Corp.	China Nanhai Oxy-Sedco Technology Co.	Guangdong	offshore oil drilling services	1984.2	operational: rig now undergoing maintenance
Schowel Asia Development Office	Shanghai Great Wall Zipper Co. Ltd.	Shanghai	Manufacturing nylon zippers	1985.9	NA
Security Pacific Corp.	China International Finance Co. Ltd.	Guangdong	international banking	1986.7 (S)	expect to open for business 12/86
Sedco Company	Tianjin Xingye Room Decoration Ltd.	Tianjin	producing bed spreads, sofa covers & other related items	1986.12	contract approved but construction not yet underway
Sino-U.S. Medical & Health Protection Industry Co.	Tianjin Health Protection Products Co. Ltd.	Tianjin	producing gauze	1986.6 (S)	NA

SINO-US EQUITY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
Sinya Research Co.	Xinya Technology Co. Ltd.	Tianjin	infrared ray and laser research	1986.7	contract approved but construction not yet underway
Smith Kline Beckman Corp.	The Sino-American Tianjin Smith Kline & Franch Laboratories Ltd.	Tianjin	manufacture pharmaceutical products	1984.6	expected operational in 4/87
Stoody Deloro Stellite Inc.	Shanghai-Stellite Co. Ltd.	Shanghai	manufacturing hardfacing alloy power	1985.5	well into construction phase
Sun Associates Inc.	China-American International New Star Computer Co. Ltd.	Hebei	providing computer hardware services	1984.10	operational
Sun Refining & Marketing Co.	China Sun Oil Co.	Guangdong	Building a lubricant blending & packaging plant	1984.6 (S)	operational
Talon Inc.	Zhenjiang Zipper Co. Ltd.	Jiangsu	producing zippers	1984	deal has fallen through, Talon has no plans for JV in China
Tambrands Inc.	Shenyang-Tambrands Co. Ltd.	Liaoning	manufacturing feminine hygeine products	1985.9 (S)	under construction w/expected completion in 7/87
Taylor-Wharton Williams Inc.	China COES-Taylor Diving Company	Guangdong	providing salvage, towing & diving services	1985.1	operational, had contract in 1986
Technology Associates International Inc.	Tianchi Telecommunication Co.	Tianjin	manufacturing program control telephone & PC boards	1986.8	contract approved but construction not yet underway
Tennesse Plastics & Engineering Co.	Hebei Tennessee Integrated Complex Corp.	Hebei	Producing and processing hard and soft plastic pieces	1985.1	NA
Thomson International Co.	Dongfeng-Thomson Co. Ltd.	Hubei	Producing mased thermostat	1985	NA
Tian Sea Corp.	Tianhai Electronic Component Material Co. Ltd.	Tianjin	manufacturing printing plates	1986.1	contract approved but no further action taken
Total Technical Services Inc.	Total Technical Services Eastern Inc.	Beijing	sell package computer deals to Chinese customers	1986.7	facilities under construction
Transworld Group	Xinjiang Finetex Co. Ltd.	Xinjiang	build and operate a spinning & weaving mill	1985.8 (S)	JV stalled, construction 90% complete,no plans to complete work near future
Transworld Group	MTEX of Beijing Woolen Textile Co. Ltd.	Beijing	NA	1986.10 (S)	preparing to put up funds
Unison International	Utex International	Shanghai	hotel & restaurant decorating & designing	1985.9	NA
United Developement Corp. of California	United Poultry and Feather Co. Ltd.	Anhui	Raising poultry	1985.10	NA
Vetco South-East Asia Co. Ltd.	Vetco-Dalong Offshore Equipment Co.	Shanghai	producing offshore oil drilling equipment	1984.12	operational
VisiData Co.	Shanghai-Cast Computer Products Co.	Shanghai	Video terminal equipment	1985.1	NA

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TY JOINT VENTURES

Major U.S. Party	Joint Venture Name	Business Activity	Date Approved (Signed)
[illegible] Co.	Shanghai [illegible] Software Corp.	software	1985.1
Wang Computer (China) Co. Ltd.	Shanghai Wang [illegible] Computer Development Corp.	producing Wang Office Assistant systems w/Chinese language software	1984.12 (S)
Warner-Lambert Co.	Suzhou Capsugel Ltd.	manufacture hard gelatin capsules	1985.10
[illegible] Trade Co.	[illegible] (Beijing)	building 300-room hotel with expatriate apartments	1985.2
[illegible] Co.	China Biomedical Science & Technology Co.	developing & manufacturing cancer drugs	1984.12
Zapata Gulf Marine Co.	Shanghai [illegible] Marine Service Corp. Ltd.	providing vessels to supply offshore drilling operations	1984.5
Sea Containers U.S. Division	NA	developing, producing & selling shipping containers	1984.10 (S)

SINO-US CONTRACTUAL JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
ARCO China Inc.	NA	Guangdong	developing S.China Sea gasfield, running pipeline to Hainan Is.	1985.3 (S)	field expected to come onstream mid-89
Abacus Group of America Inc.	Shenyang International Trade Center	Liaoning	design, construction & management of international trade center	1986.4 (S)	contract signed, still negotiating fine points
Asia Development Co.	Shanghai Asia Development Corp.	Shanghai	apartments	1985.8	NA
Asiagraphics Corp.	NA	Shanghai	market & develop Chinese language software programs	1985.11 (S)	expect operational by 3/87
Bausch & Lomb Inc.	Beijing Contact Lense Ltd.	Beijing	producing contact lenses	1986.7	operational
Beijing-Washington Inc.	GenRad/Contact Systems/Misc. Service Centers	Beijing	3 service centers for: (1) GenRad Inc. (2) Contact Systems Inc. (3) various firm's equipment	1986.4 (S)	operational, plans for 4th in Beijing & 5th in Nanjing
Brimble Bros. & Co. Inc.	Lingbo Mansions	Shanghai	building a 700 room hotel	1986.5	NA
Brown & Root International Inc.	CDES Brown & Root Marine Construction Co.	Beijing	installation services for offshore oil & gas development projects	1983.10 (S)	inactive, awaiting business to be generated by B&R JV w/CSSC
Brown & Root International Inc.	NA	Beijing	cooperation on mining, road & bridge construction projects domestic & foreign	1984.12	alive but inactive
Business Week International	Business Week, Chinese Language Edition	Beijing	publish Chinese language business monthly with articles from Business Week magazine	1986.8 (S)	operational
Caltex Co.	Caltex-Shenzhen General Oil Product Agency	Guangdong	build/operate 8 gas stations, aquire rights to use portion of Shekou oil products export depot	1983.7	operational (4 stations), 5th to open 1/87, remaining 3 later in year
China Communications Co.	China/USA Television Commercial Production Co.	Beijing	producing commercials, programming & documentaries, selling airtime	1984.10 (S)	NA
China United Trading Corp.	Shanghai United Taxi Corp.	Shanghai	taxi rental	1984.12	NA
Chinamerican Corp.	Stone Flower Mountain Inn	Guangdong	build & operate a 400 room hotel	NA	operational
Del Monte	Del-Monte/Shanghai Canning Factory	Shanghai	NA	1986.9	NA
F&T Shanghai Hotel Associates	Shanghai International Conference Center	Shanghai	hotel & conference center	1985.7	NA
Foster Wheeler Corp.	Joint Research & Development Program for the 2nd Generation Fluidized Bed Boiler	Beijing	Joint research/development of 2nd generation fluid bed biolers	1985.4 (S)	operational, research underway
General Electric International	NA	Beijing	providing services to endusers of GE medical equipment	1986 (S)	just established

SINO-US CONTRACTUAL JOINT VENTURES

Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
John Portman Associates	Shanghai Exibition North Complex	Shanghai	design, construction & management of exibition complex	1985.9	under construction, expected operational mid-89
Kowin Building Development Corp.	Jinhua (Golden Flower) Hotel	Shaanxi	600 room 8-story hotel	1983.3	operational (phase 1), phase 2 under construction, to open 12/86
McLean Properties Development Co.	Shanghai Lanchun Guesthouse	Shanghai	hotel	1985.9	NA
Mobil Oil (HK) Ltd.	NA	Shanghai	blending & marketing Mobil formula lubricants	NA	NA
Motorola Inc.	NA	Jiangsu	distribution & service of Motorola's products	NA	operational
Ms. Carlina Albert	Huamei Banzai Co.	Zhejiang	miniature gardens	1984.11	NA
Occidental Petroleum Corp.	Island Creek of China Coal Ltd.	Shanxi	jointly developing the Antaibao open pit coal mine in Pingshou, Shanxi	1985.6 (S)	arranging finances
Offa International U.S.A. Corp.	Kangle Electronic Games Recreation Room	Shanghai	electronic games	1985.7	NA
Peat, Marwick, Mitchell & Co.	Peat, Marwick Guangzhou Corp.	Guangdong	accounting, taxation & management consulting services to business enterprises in China	1987.1	waiting for business liscence
Pepsico International Ltd.	Shenzhen Happiness Soft Drink Factory	Guangdong	bottling Pepsico soft drinks	1981.3	operational
Pepsico International Ltd.	Guangzhou Pepsi Soft Drink Factory	Guangdong	manufacture plastic bottles, bottle Pepsico soft drinks	1985.2 (S)	operational
Pepsico International Ltd.	Fuzhou Pepsi Cola Soft Drink Factory	Fujian	bottling Pepsico soft drinks	1986.11 (S)	expected to open 11/88
R.J. Reynolds	NA	Fujian	producing camel filters	1980.4 (S)	operational
Raytheon Marine Co.	Xiamen Marine Equipment Co. Ltd.	Fujian	developing, producing and selling electronic ship instruments	1984.3	operational
Shearson Lehman Brothers Inc.	Peking American Express Building	Beijing	building residential/commercial complex	NA	expect to complete construction 1990
Sun Associates Inc.	American Sun Electronic (Shekou) Co. Ltd.	Guangdong	computer software development	1986.10	operational
Sunnen Products Co.	CATIC Sunnen Honing Systems Technical Service & Promotion Center	Beijing	market & service Sunnen's precision sizing 7 hole finishing equipment products in China	1985.11 (S)	NA
Technology Exchange Corp.	China/Tech Ltd.	Beijing	China investment advisory services	1986.2	operational, currently involved in approx. 40 projects
U.S.-China Trading Co.	McDonald Co.	Shanghai	Fast Food	1985.9	NA

SINO-US CONTRACTUAL JOINT VENTURES

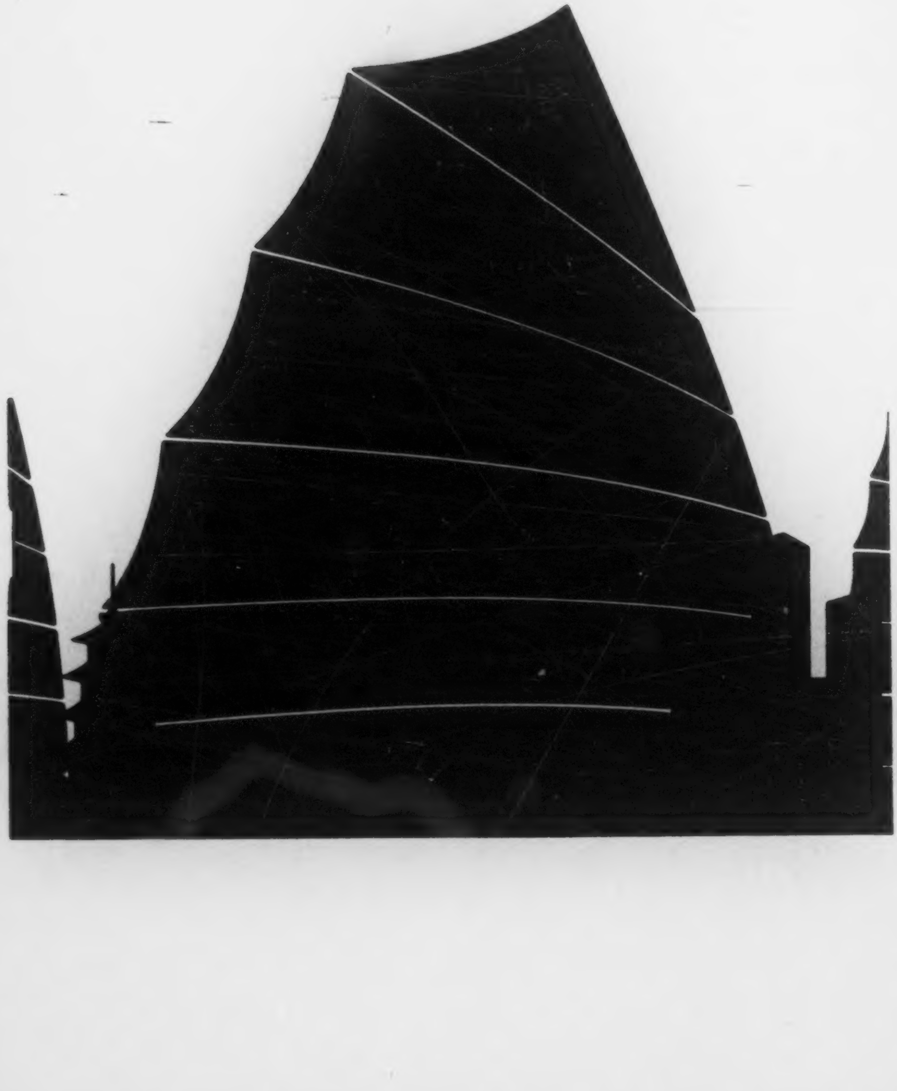
Major U.S. Party	Joint Venture Name	Location	Business Activity	Date Approved (Signed)	Operating Status
Wang Renyu (American Citizen)	Jinmei Environmental Research Service Center	Tianjin	NA	1986.2	approved but construction not yet underway

June 1987

CONGRESS OF THE UNITED STATES OFFICE OF TECHNOLOGY ASSESSMENT

CONGRESSIONAL SUMMARY

TECHNOLOGY TRANSFER TO CHINA



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Director

JOHN H. GIBBONS

The Technology Assessment Board approves the release of this report. The views expressed in this report are not necessarily those of the Board, OTA Advisory Council, or individual members thereof.

Cover design by John Bergling

Foreword

Momentous changes continue to occur in China. The high priorities now accorded economic modernization and improved global relationships present a sharp contrast to the years of the Cultural Revolution and earlier. Yet there is great uncertainty over China's future course. China may be a constructive trading and strategic partner, or it may choose a more divergent path. U.S. decisions on technology transfer will be an important determinant of which path is followed and the implications for the world.

This report responds to requests from the House Committee on Energy and Commerce and the Senate Committee on Banking, Housing and Urban Affairs for an assessment of the economic and strategic implications of technology transfer to the People's Republic of China and of Congressional actions that would affect it. In addition, the Senate Select Committee on Intelligence endorsed the study request.

The first phase of this study focused on energy. A Technical Memorandum, *Energy Technology Transfer to China*, was released in September 1985, and proved useful in the Congressional debate on the nuclear cooperation agreement.

This document analyzes the factors in China that affect technology transfer and will be affected by it. The experiences of U.S. and foreign companies in the China market are described. We discuss the evolution of China's economy, polity and foreign policy, and how different expectations suggest different policies for the U.S. Government.

In the course of this assessment, OTA drew on the experience of many organizations and individuals. We appreciate the assistance of the project's contractors who prepared much of the background analysis, the U.S. Government agencies and private companies who provided much valuable information, the Chinese institutions which facilitated the visits of our researchers, the project's advisory panel and workshop participants who provided guidance and review, and the many additional reviewers who helped ensure the accuracy and objectivity of this report.

John H. Gibbons

JOHN H. GIBBONS
Director

International Security and Commerce Program Technology Transfer to China Advisory Panel

Robert Dernberger, *Chairman*
Director, Center for Chinese Studies
The University of Michigan

A. Doak Barnett
Professor, School for Advanced International Studies
The Johns Hopkins University

Gareth Chang
President, McDonnell Douglas China Inc.

Chauncey Chu
Vice President of Manufacturing
Wang Laboratories, Inc.

Bo Denysyk
Vice President, International Affairs
Global U.S.A., Inc.

Basil K. Fox
Bechtel China Inc.

Admiral Thomas Hayward, USN (ret.)
President, Hayward Associates

Richard Holton
Professor, School of Business Administration
University of California

Morton Kaplan
Professor, Department of Political Science
University of Chicago

Arthur A. Klauser
Senior Vice President
Mitsui & Co. (USA) Inc.

Stanley Lubman, Esq.
Heller, Ehrman, White & MacAuliffe

Charles Lucy
Director, International Operations
Corning Glass Works

Bruce Lusignan
Professor of Electrical Engineering
Stanford University

Leo A. Orleans
China Consultant
Library of Congress

Professor William Parrish
Director, Center for Far Eastern Studies
University of Chicago

Vaclav Smil
Professor of Geography
University of Manitoba

Roger Sullivan
President
National Council for US China Trade

NOTE: OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members. The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for the report and the accuracy of its contents.

OTA Project Staff

Lionel S. Johns, *Assistant Director, OTA*
Energy, Materials, and International Security Division

Peter Sharfman, *International Security and Commerce Program Manager*

Alan T. Crane, *Project Director*

Eric O. Basques:
U.S. Commercial Experiences, Military Technology

Martha Caldwell Harris:
U.S. Policy, Multinational and Strategic Issues

Richard Peter Suttmeier:
China's Context, Trends, and Foreign Policy

Contributors

Craig Allen
Matthew J. Bryza
Joanne Sedor
Alan Shaw
Franklin Zweig

Administrative Staff

Jannie Coles
Cecile Parker
Jackie Robinson

In Memorium

Dottie Richroath

Contractors

Thomas Fingar
William A. Fischer
Paul Folta
Thomas W. Robinson
Denis Simon
Kathryn Van Wyk
China Business Development Group
Global Associates, Ltd.
Midwest China Center
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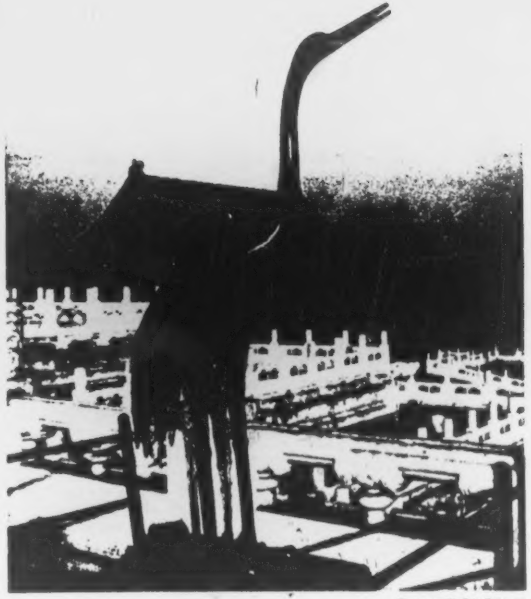

Photo credit: Eric Basques

Bronze Crane in the Forbidden City in Beijing.
The crane is a legendary symbol of long life.

Technology Transfer to China

A billion people! If they each buy just one . . .
If we give them technology, they'll be just like Japan . . .
In a country that can launch satellites, why is the plumbing so bad . . .
All they want is technology, and they expect miracles from it . . .
It's completely different now. It's hardly even Marxist . . .
So where are all those Red Guards now? Aren't they just waiting . . .
If we don't sell it to them, France or Japan will . . .
They'll pin down the Russians on the Eastern front . . .
How do we know they won't use it against Taiwan—or us . . .
There's a lot we can learn, too . . .

China evokes countless, often contradictory, expectations and impressions. What is clear is that China will become increasingly important to the United States over the next several decades. Its impressive economic growth in recent years, if continued, will propel it into the ranks of the newly industrialized economies of Asia—Taiwan, South Korea, Hong Kong, and Singapore—but eventually on a much larger scale. International trading patterns are likely to change dramatically as China increases both imports and exports. China will also acquire increasing political influence in world affairs as its economic, technological, and military strengths grow. U.S. interests in Asia will be profoundly affected by China's international role, including its relations with the Soviet Union, Taiwan, and other neighbors.

As important as these developments are, the U.S. ability to influence them is limited. China's economic growth is much more dependent on internal Chinese factors than on any U.S. actions, and China will play its international role on the basis of its own perceived best interests. What the United States can do is reinforce China's constructive choices and trends, and protect itself against the risk that Sino-American interests will again diverge.

One of the most important influences that the United States has is technology transfer. China recognizes the need to acquire new technology and new capabilities in its efforts to modernize and expand its economy. This need was one of the main reasons for ending its self-imposed isolation and for opening itself to the West in the 1970s. The United States benefits insofar as China is a strategic asset, if not an ally, in the global competition with the Soviet Union. Technology transfer helps build these ties and increases China's strength vis-à-vis the

Soviet Union. It also can lead to important commercial ties and to the export of American products. In addition, China is still a very poor country, and technology transfer can be an important element in humanitarian efforts to help a billion people move out of poverty.

U.S. policy toward China for the past 10 years has been predicated on the assumption that closer relations are generally beneficial but that caution must be exercised in the transfer of advanced, sensitive technology. This policy has had some success: China has played a more constructive international role, and many areas of common interest (reportedly including sensitive intelligence gathering) have been found. Trade has also become significant. With so much gained, some ask whether further steps are warranted—in particular, whether the United States should make greater efforts to help China modernize through technology transfer.

However, the reasons for caution have not been eliminated, and some observers feel that U.S. policy has gone too far: that China is a potential adversary, with an alien ideology and an unstable, unpredictable political system. Others see China as a newly industrializing country that is rapidly upgrading its production technology and agressively seeking international markets, becoming another, potentially much more powerful, Japan or Korea. Both views suggest great caution with respect to technology transfer.

It is the intent of this assessment to put these views into perspective and to contribute to a reexamination of U.S. policy toward China. The assessment evaluates the economic, political, and strategic implications of technology transfer to China in the context of China's capabilities and evolution. It reviews the U.S. commercial and governmental role in technology transfer, and the policies and practices of other countries. It asks whether the application of U.S. policy has been consistent with the overall guidelines, and analyzes policy options for Congress in the areas of export control, trade promotion, and military cooperation.

As used in this assessment, *technology transfer* is a process whereby a government, company, or institution provides the information necessary for China to improve its capability to design or produce goods or services. It may or may not involve the sale of equipment, but it almost always involves exchanges of information between people. Technology transfer may involve the transfer of sophisticated equipment, training in its use and maintenance, and information on design or manufacture. Indirectly, it may include the teaching of technology and management in universities. Commercial technology transfer can be accomplished through sales of equipment or expertise, licensing agreements, direct sales of information, or investments in China. The U.S. Government transfers technology by granting access to information (e.g., the U.S. National Technical Information Service) and through agency-to-agency agreements.

Technology transfer can provide some of the keys China needs to meet its modernization goals. Modernization, in turn, will enhance China's position as an exporter and will eventually enhance China's military strength. The positive and negative implications for the United States can be estimated only imperfectly. The following sections summarize the critical factors.

CHINA'S NEED FOR TECHNOLOGY

China has considerable technological capability already, especially compared with that of other developing countries, but progress has been very uneven. Military industries in particular have been favored with priorities for investments and personnel. Some of these industries have developed "pockets of excellence" that can compete in world markets. For example, China has built and launched its own experimental communication satellites and has offered to launch foreign satellites. The military sector has now been ordered to help the civilian sector, especially since many military factories are underutilized because of the recent lowering of defense budgets. **If this expertise can be used effectively, it may have a substantial impact on civilian production and exports.**

Much of China's civilian technology is out-of-date, if not obsolete. The Seventh Five-Year Plan (1986-90) has set the acquisition of technology as a high priority, especially in the fields of transportation, electronics and computers, telecommunications, and energy. The plan calls for importing much of this technology. One of the "Four Modernizations"—the policy program for development—was to raise the level of science and technology. The others—agriculture, industry, and defense—also to a large degree depend on improvements in technology. Some of these improvements could be accomplished by the purchase of modern equipment without technology transfer, but China has limited funds for imports. China could develop some technologies independently, but in general this would be much slower and less efficient than acquiring them from abroad.

China has ambitious goals, including a quadrupling of the 1980 industrial and agricultural output by year 2000. Progress so far has been above that rate (about 7 percent), primarily because a loosening of controls has freed a latent strength in the economy. New technology has made only a minor contribution but will be of increasing importance in the future. Goals for economic growth will not be met without improved technology to modernize industry and to alleviate constraints in energy, transportation, and communications.

Technology transfer can foster not only an increase in production, but also an increase in the quality of products. Modern industrial equipment can easily surpass the quality levels of the antiquated equipment typical of Chinese factories. Exposure to modern management practices, which technology transfer often entails, broadens the Chinese manager's concepts of what can be accomplished and how. Coupled with these new tools has been the realization of the need for quality in products if China is to compete well enough in world markets to earn the foreign exchange to continue buying technology.

However, China's modernization does not yet appear to have reached the point where improvements in one sector lead to improvements in others. There have, of course, been many examples of successful assimilation of specific technology transfers, but there have also been many cases of failure or incomplete success. For instance, computers and other modern equipment sometimes remain unused because of a lack of expertise or an adequate supply of a necessary input, such as electricity.

The question is not whether China is capable of modernization, but whether it is willing to make enough of the changes required for continued, rapid modernization. Like other centrally planned economies, China developed a pattern of decisionmaking that discourages efficiency and innovation, and gives the management of a productive enterprise few incentives to improve. The economic reforms that have been initiated since the Cultural Revolution have been directed at providing workers and management with incentives to increase output and quality and to improve economic decisionmaking. Measures taken include increasing the autonomy of enterprises, allowing them to retain and reinvest earnings, freeing up some markets, loosening price controls, and reducing the role of the Chinese Communist Party. Reforms have been successful in agriculture but less so in industry. Delays in price reform and opposition by those fearing loss of their power have slowed improvements in efficiency.

China's "Open Door" policy is closely related to economic reforms and is intended to facilitate technology transfer and trade. Under this policy, economic zones and coastal cities have been opened to foreign investment, and joint ventures and cooperative manufacturing have been encouraged.

To date, however, the results have been somewhat disappointing. Investments have been lower than expected, and many problems have been encountered, including high costs, shortages of skilled workers and supplies, and unfamiliarity with quality and scheduling requirements. Moreover, most enterprises are risk-averse, and the incentives for new capabilities may be weak if other constraints (e.g., energy or materials) limit production in any case. **Delays and uncertainties caused by the intricacies of Chinese bureaucracy have been particularly frustrating for outsiders trying to do business.** Although the Ministry of Economic Relations and Trade (MOFERT) was established to facilitate trade, the process is still cumbersome and full of pitfalls. If new technology is sought, approval may be needed from both the local authorities and several agencies of the central government, depending on the enterprise, the priority of the technology, and the cost.

The shortage of foreign exchange has become critical over the past year. Unlike many developing countries, China has refused to go heavily into debt, and it has had many competing requirements for its declining foreign exchange reserves. Decisions on which technologies to import are now frequently biased by considerations of how much foreign exchange can be earned rather than by how much the Chinese economy would benefit. Petroleum technologies have been particularly favored because petroleum is one of the most important exports, even though infrastructure (e.g., electric power, transportation, communications) inadequacies have been much more of a constraint on the economy.

Despite many problems, China's economy is growing very rapidly and that is likely to continue. There is also evidence that the technology transfer process is improving, and that modernization will benefit considerably.

THE U.S. ROLE IN TECHNOLOGY TRANSFER

Most technology transfer from the United States is from private companies. Although most U.S. firms approach the China market with the intent to sell products, many find they must include technology transfer if they wish to gain access to the China market. The variety of experiences are illustrated by the following examples:

- General Electric won two large orders for locomotives in part by a willingness to transfer the technology of materials and manu-

Photo credit: General Electric

A General Electric Co. locomotive pulls a train near the Great Wall. GE's locomotive contracts have included technology transfer in the form of training and information.

facture. G.E. is not setting up any manufacturing facilities in China, though an important part of the contract stipulated that China would produce several of the parts for the locomotives. The first contract took several years to negotiate. The second needed only a few months, largely because trust had developed among the participants. G.E. was also flexible in tailoring the locomotive design to Chinese requirements.

- American Motors established a joint venture with the Beijing Automotive Works to produce AMC's Cherokee model. Initial production has used parts sent from the United States. The intent was to increase the local content as rapidly as possible, but China has been unable to produce parts and supplies in the quantity and quality required. As a result, costs are high and export of the Cherokees has been impractical. China's foreign exchange crisis interfered with the purchase of U.S. parts, leading to a shutdown of the plant for 2 months, though a compromise has allowed restart.
- McDonnell Douglas has started coproduction of 25 MD-82 twinjet transports with the Shanghai Aviation Industrial Corp., following a sale of 5 to China. The planes are being produced partially under the direction of Americans, with the first plane expected to fly in 1987. Training will also be provided for the Chinese in the United States. The planes are to be certified for airworthiness by the U.S. Federal Aviation Administration, which provides an explicit standard for quality control.
- There have been no commercial satellite telecommunication sales despite two sets of proposals by U.S. and European companies. The Chinese received considerable technology transfer for free as a result of these proposals, but that probably was not their intent. Rather, China's conflicting priorities and bureaucratic power struggles, combined with the shortage of foreign exchange, have delayed a decision. China has launched two geosynchronous communication satellites of its own design, but both were relatively unsophisticated. It is unlikely that China's own products will be competitive for several decades, even with imported technology. The parallel effort on rockets is much more competitive, especially since the U.S. and European programs are temporarily inoperative because of accidents.
- IBM has been very successful in selling computers to China, but has not yet initiated any manufacturing. Technology transfer has been largely limited to training in the use of computers. IBM may be in a unique situation to resist pressures for investment in China because of its dominant role in the international computer industry.
- Wang Laboratories is preparing at least one joint venture for the assembly and eventual manufacture of microcomputers. Included would be engineering, managerial and manufacturing expertise, software diagnostics, and after-sales techniques. This effort would complement Wang's sales to China and its manufacturing in other countries. However, Wang is concerned about China's lack of experience with large-scale production and the difficulty of maintaining quality control.

One hallmark of these cases is the lengthy negotiations. Wang started in 1980, and negotiations are only now coming to a conclusion. The McDonnell Douglas agreement took 10 years. The satellite proposals started in the late 1970s, with no commercial results yet.

China's shortage of foreign exchange has become a critical problem in cases such as AMC's joint venture. The import of supplies and the repatriation of profits are difficult. Recent Chinese regulations require foreign ventures to export or supply advanced technology in return for access to China's market. In many cases, however, the quality of the goods produced is not up to international standards, which greatly limits exports.

In addition, taxes and unexpected expenses have made China one of the most expensive places in the world in which to do business. A company usually cannot hire its own employees; they are supplied by the state at a cost far higher than their actual salaries, and they cannot easily be replaced if they are incompetent or are transferred by the state. One of the main advantages of manufacturing in China—low-cost labor—is thus lost. Chinese managers also tend to be very cautious and frequently seem to lack a spirit of innovation.

High costs and bureaucratic rigidities are particularly difficult for small companies to manage. Few can afford to have a representative in China or continue negotiations for extended periods. Small companies are also particularly disadvantaged by complex export controls. However, some small companies have established profitable niches, particularly in the sale of specialized equipment.

Overall, businesses report mixed results in China. Some have lost money on early ventures, in the hope of building a profitable, long-term relationship, only to find China turning to competitors or dropping those imports altogether. **The investment climate is particularly poor.** The rate of foreign investment dropped by over 20 percent in 1986. China's leaders have recognized that foreign companies are being deterred by many regulations and costs over which the Chinese Government has control, as well as by more intractable deficiencies in skilled manpower, infrastructure, and resources. Significant steps have been taken to improve the atmosphere for foreign business (e.g., preferential tax treatment), but it remains to be seen whether these will be adequate.

It should be noted that some U.S. companies are doing quite well in China, particularly those that are not involved in joint ventures or other manufacturing investments. Two-way trade is over $8 billion and is still rising. Some companies recognize that it takes a long time to get established but are convinced that eventually the Chinese market will justify their patience. Others are waiting for other markets to improve, and anything sold to China will help bridge a gap, even if at little or no profit.

U.S. Government agencies are also involved in technology transfer as part of an overall effort to cooperate with China and improve relations. A broad agreement on science and technology cooperation was signed in 1979, and 25 protocols implementing the agreement in specific areas such as telecommunications, agriculture, space, environmental protection, transportation, and student/scholar exchange have been signed. Three more are pending. These contacts have facilitated commercial transactions and improved political contacts.

The presence of 17,000 Chinese students and scholars (half of those sent abroad) in American universities has been one of the most effective forms of technology transfer. Most students are in science or engineering courses. It appears that most students leave with friendly personal ties as well as an education, but it is not yet clear whether this will lead to commercial or political benefits for the United States.

The United States has many advantages in competing for the Chinese market (e.g., a reputation in China for advanced technology, connections through many Chinese-Americans, the popularity of the English language in China) but other countries seem to be doing relatively better in trade. Japan exports twice as much to China, and the nations of Western Europe collectively exceed the U.S. level. There are several reasons for this: American companies historically have been less concerned with exports, which have been very difficult during the last few years because of the high dollar. However, government trade policy is also a direct influence. **U.S. export controls are time-consuming and laborious compared with those of other countries, and appear to be applied more rigidly.** Moreover, Japan and West Germany have extensive foreign aid programs in China that lead to considerable trade. Japan, France, Italy, and others provide extensive official financing for exports. As discussed below, the United States does not necessarily have to emulate these tactics, but changes could be considered to improve the competitiveness of American companies.

ECONOMIC AND POLITICAL IMPLICATIONS

Technology transfer will have profound long-term impacts on China's economic and political future. Some sectors such as consumer electronics will benefit considerably because the industry has a head start or because the technology is more easily assimilated. Past experiences suggest that others will find foreign technology to have little effect because the industry is unprepared. **Dissemination of the management concepts of quality, efficiency, and timeliness may be the most important result of technology transfer.** Improvement in the quality of Chinese products (necessary for them to compete in international markets) may be the first general impact of technology transfer to be visible.

It appears quite probable that China's economic growth will remain high (above 5 percent and possibly over 7 percent). The goal of quadrupling the 1980 output by year 2000 should be attainable, though several factors could interfere. Foreign exchange limitations, energy constraints, and political instability could all hold the growth rate down.

China's exports should also rise rapidly over the next 15 years, but the competition with American products will not be great. The newly industrializing economies, including Korea, Taiwan, Mexico, and Brazil are more likely to feel the competition. Direct competition with either industrialized countries or less developed countries is less likely because the product mix will be different. One exception may be American agricultural exports to Asia, which could be hurt by rising Chinese surpluses. On the whole, however, China's increased role in the international economy should be beneficial for the United States.

Several factors may slow China's export growth: rising protectionism in the developed countries may preclude growth in sectors, such as textiles, where China is strong. Diminishing foreign exchange reserves

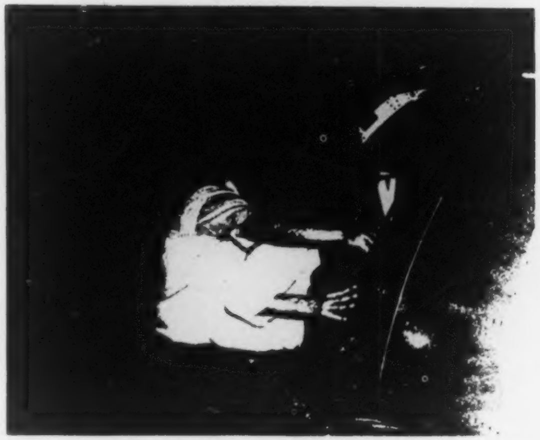

Photo credit: McDonnell Douglas Corp.

Construction of an MD-82 twin jet transport at the Shanghai Aviation Industrial Corp., under a coproduction agreement with McDonnell Douglas Corp. The 25 planes will be certified by the U.S. Federal Aviation Administration.

could limit China's ability to invest in new productive capacity. If the quality of China's products doesn't improve sufficiently, there will be limited markets for them in the West, and China may have to turn to the Soviet bloc for trade and credit, a trend that is already appearing.

There is a strong relationship among modernization, economic reforms, political changes, and technology transfer. As long as modernization is a prime goal (as it has been for the last 10 years), most economic reforms made to date will be retained. Modernization depends on technology transfer to achieve more efficient production, and further economic reforms will be needed to assimilate technology. However, the economic reforms are straining the political system, as evidenced by reactions to recent public demonstrations. If political reforms do not reinforce economic reforms, modernization is likely to be slow.

Some of the more difficult economic reforms have yet to be implemented. Price decontrol is essential for rational economic decisionmaking, but it strikes at the heart of the concept of the planned economy.

Mobility of labor would increase productivity but would bring unaccustomed social dislocations. Recent developments suggest that there is a strong resistance to reforms such as eliminating the control of Communist Party cadres over factory operations. If China insists on making ideology preeminent, it is unlikely to greatly improve its economic efficiency.

The leadership succession to Deng Xiaoping is one of the most crucial questions. Virtually all of China's leaders support economic reform, but there are major differences of opinion over how fast and far it should proceed. Promoting technology transfer benefits the United States by strengthening the hand of reform-minded leaders who have favored opening up to the West, largely to obtain technology.

If China's modernization program turns out to be even a partial failure, there are likely to be negative implications for the United States. A society disappointed and frustrated from unmet expectations of economic improvement would be more susceptible to political extremism, which could easily have ramifications for Taiwan and Korea. China would also be a less valuable trading partner for the West and could move closer to the Soviet bloc which presents fewer demands for hard currency and quality products.

However, successful reforms will create their own problems. Rising expectations of the population and critical environmental problems will make enormous demands on the leadership. Economic and political changes are creating an environment that will encourage a pluralism of ideas and a liberalization that is incompatible with traditional Communist Party control. It remains to be seen whether the party can accommodate itself to these changes and define a new social role, or whether it will attempt to slow modernization to preserve its control. The present problems of the reform movement indicate that the party conservatives still have considerable power, but China's political evolution is likely to exhibit many unpredictable shifts.

STRATEGIC IMPLICATIONS

Technology transfer will assist China's military. The important questions are how much it will help and how much that matters to the United States or its allies. The first question involves China's military needs and internal capabilities, the second involves China's foreign policy.

At present, China's military is large but unsophisticated technologically. It has a great many tanks and planes, some missiles, nuclear warheads, and ships, and even a few nuclear submarines, but all are outdated and much less effective than U.S. or Soviet equivalents. China is not a major power even regionally, as demonstrated by its ineffectual excursion into Vietnam in 1979. China's military capability is improving, especially in the strategic forces needed to deter a Soviet attack and in nontechnical ways such as command structure and professionalism, but the process will be gradual.

China's military can benefit from foreign technology in three ways: it can buy military technology directly, obtain civilian technology that has military applications, or develop its own modern weapons systems as its economy as a whole modernizes.

The United States and other nations have offered to sell military equipment to China, including the avionics package for the F-8 fighter, but there have been few contracts because China apparently cannot afford to buy many weapons systems. Acquiring modern weapons would be the fastest way to a modernized military, but China does not feel the need to be pressing enough to sacrifice its economic priorities. Instead, it prefers to import technology rather than equipment, a rationale particularly compelling for the military, which often needs very large quantities of each piece of equipment.

The transfer of dual-use technologies has increased rapidly. While it is reasonable to assume that China's military has access to such technology if it demands it, that does not mean that the military will be able to use it effectively. Until recently, civilian and military enterprises were kept separate, with the military being given priority on resources and talent. Military factories were significantly more sophisticated than civilian ones. This has changed over the past few years. Civilian factories have enjoyed much more technology transfer and appear to be modernizing faster. Both have exhibited considerable difficulty in assimilating new technology. For instance, the United Kingdom transferred the Spey jet fighter engine technology, but the military factory never was able to manufacture it successfully. Examples of successful reverse-engineering are very few. Chinese military factories produce large quantities of unsophisticated weapons that sell well in the Third World, but their production of sophisticated systems is very limited.

Modern military systems are complicated and demanding. They must be designed by teams of talented and experienced engineers and scientists representing a variety of disciplines. Their manufacture calls for additional expertise and the availability of precision production equipment and high-quality supplies. China's difficulty in assimilating advanced technologies suggests that more could be transferred without incurring much risk that China will use them to produce sophisticated weapons systems, but this risk will grow over the years as China's technological capability improves.

For instance, table 1 shows the major components and technologies involved in anti-submarine warfare (ASW), one of the key mission areas which would significantly enhance China's overall military capability. Critical ASW technologies should not be transferred unless there is an explicit political decision that this would be in the U.S. national interest. Those technologies that are unique to ASW are clearly critical. Others are so readily available for commercial uses that no purpose would be served in trying to contain them. The difficulty comes with the intermediate, dual-use technologies, such as spectrum analyzers, the electronic instruments used to identify the source of noise by analyzing the acoustic patterns.

Table 1.—Anti-Submarine Warfare Technology

Anti-submarine warfare (ASW) is the detection, identification, and destruction or disabling of an enemy submarine. ASW can be conducted from any suitable "platform" from the air, sea surface, or from another submarine. The basic functions needed to successfully conduct the ASW mission are the same for each platform:

1. **Detection**: by either acoustic or nonacoustic methods.
2. **Classification**: determination of the type of target.
3. **Localization**: target motion analysis and contact management.
4. **Approach to the Target**: closing in on the submarine to within range of one's own ship or aircraft weapons.
5. **Weapon Deployment (Launch)**: actual attack.
6. **Evasion and Reattack**: performed if necessary.
7. **Related Functions**: tactics such as mine avoidance, mine deployment, and surveillance performed as necessary.

Although the basic required ASW functions listed above are always the same, the complexity and difficulty of each of these elements varies from case to case and from platform to platform.

There is no one ASW technology. These functions require the implementation of many different technologies, and capabilities are required across a broad spectrum of engineering and science. Some technologies are critical in the sense that if their performance is substandard, the whole ASW system is significantly affected. Each increased level of sophistication will have a higher level of success in ASW, but there are many different levels that can be successful. Following are the critical technologies, grouped by commercial availability.

a. *Critical technologies not commercially available (easily controlled):*
   - Propulsion design
   - Low-noise machinery design
   - Sonar dome
   - Transducer design
   - Classification techniques/algorithms
   - Acoustic correlation algorithms
   - Contact motion analysis
   - Tracker design algorithms
   - Passive ranging techniques
   - Weapon guidance
   - High-density power-pack design
   - Small-size high-power train design
   - Exotic fuel design
   - Power engineering
   - Multipath processing techniques

b. *Critical technologies with less sophisticated versions available commercially (control is complex):*
   - Low speed turbines
   - Bearing design
   - Baffle design
   - Beamformer techniques
   - Local area network design
   - Spectrum analyzer design
   - Microelectronic design
   - Beamformer design
   - High-speed graphic techniques
   - Colorbit plane graphics
   - Shape charge techniques
   - Fusing design
   - Magnetic anomaly detection

c. *Critical technologies readily available commercially (controls futile):*
   - Corrosion resistance
   - Ceramic design
   - Elastomer technology
   - Machinery isolation
   - Spectral analysis algorithms
   - Acoustic performance prediction techniques
   - Environmental sampling techniques
   - High-speed math processor design
   - Minicomputer design
   - High-explosive technology

SOURCE: Adapted from: "Assessment of ASW Technology Transfer to the People's Republic of China," contractor report prepared for OTA by [illegible], Ltd., Alexandria, VA, December [illegible].

Spectrum analyzers are sold frequently to China, including sophisticated models that would be useful in ASW (though they would not play a prime role in U.S. ASW). However, this technology would be extremely difficult to reverse engineer. Moderate relaxation of controls over exports of spectrum analyzers would give China access to more equipment to upgrade its ASW, but would not in itself seriously

[illegible]

ural part of the growing relationship, but concrete steps toward cooperation have been tentative. U.S. arms sales to China, while increasing, remain well below the level of sales elsewhere in Asia, such as to South Korea and Taiwan.

At worst, the current policy of technology transfer to China entails only moderate direct risk to the United States. China will not have the strategic strength for serious threats for several decades. While China has a few intercontinental ballistic missiles capable of reaching the United States, it also has compelling reasons not to launch them. However, other U.S. interests could be threatened more easily. **In particular, as a regional power, China would be capable of putting great pressure on U.S. allies in East Asia.**

Asia has been a region of relative stability and peace since the end of the Vietnam war, with the exception of the Kampuchean problem. There are, however, tensions and several potential flashpoints, specifically Korea and Taiwan. Military outbreaks could become of global significance, especially considering the U.S. and Soviet interests in the area. **The large-scale Soviet military buildup and political motivations are the greatest concerns to the United States.** China shares this perception, which has become the basis for de facto military cooperation [illegible]

[illegible]

A Chinese-developed communications satellite, which was launched [illegible] in February 1986 on the Long March 3 rocket. [illegible]

Asian countries have large Chinese populations, compounding the uneasiness. Such feelings may be inevitable, considering China's size, but special sensitivity by the United States may help minimize future problems. For instance, consultations with these countries on U.S. relations with China may provide reassurances of U.S. intentions.

U.S. POLICY CHOICES

U.S. policy currently supports the transfer of technology to China, but within certain limits set by national security considerations. The fundamental rationale for this policy, supported by four U.S. administrations, is that assisting China in its modernization will serve U.S. interests. This general framework represents a compromise between optimism and caution, and permits a flexible approach to specific policy choices. For example, advanced dual-use technologies and arms can be exported on a case-by-case basis, depending on the nature of the technology, the Chinese recipient, the conditions of the sale, and other factors.

The flexible approach has permitted the relaxation of controls as relations have improved and has brought significant benefits to the United States. However, case-by-case export controls are complex to administer (delays in export licensing are often the result) and can yield inconsistent decisions.

U.S. policy also includes some promotional programs to foster exports of nonsensitive equipment and technologies, but these programs are much less extensive than those of Japan, France, and other countries. There is no U.S. aid program and government financing of exports is quite limited relative to other countries.

There is a broad consensus that overall policy is on the right track, but changes in emphasis could be considered to improve the benefits for the United States. One alternative theme would emphasize a more activist strategy of technological cooperation: explicitly using technology transfer to improve relations and trade. Another possibility would be to make better use of technology transfer as a bargaining chip in U.S.-China relations. A third would be to emphasize the multilateral aspects of export control and trade with China.

It would of course be possible to pull back and further restrict technology transfer. However, in the current climate of improved U.S.-China relations, such an approach would appear to be counterproductive. It would alienate China without denying it access to advanced technology, given the availability from many other suppliers. If the worst fears are realized, and China does revert to hostility, the present system can adapt to the change.

Regardless of whether or not a more explicit strategy is developed, a number of specific issues will be addressed by Congress. Most attention has been focused on export controls. For advanced exports with military significance, the United States maintains a system of extensive reviews to ensure that U.S. national security is preserved. The Department of Commerce (DOC) is the lead agency, but the Departments of State and Defense also participate. Multilateral review through COCOM[7] is also required on many such exports.

U.S. industry has been critical of China export controls, protesting lengthy reviews and contracts lost to firms from other countries as a result of more stringent U.S. controls.[8] OTA's research confirmed that other countries are generally able to reach a decision on even sophisticated dual-use exports in a few weeks, while the United States frequently requires months or even years. In addition, only the United States unilaterally imposes controls on items not on the list of COCOM controlled items, and requires that exports to allied countries, if re-exported to third countries, be again subject to the original licensing. The latter requirement has also caused considerable discord between the United States and other COCOM members.

It is difficult to quantify sales lost due to export controls, because so many factors affect the competitiveness of U.S. firms in the China market. The green zone (items likely to be approved for export) has been expanded to cover items in 30 categories on the Commodity Control List. **Today, U.S. controls on exports to China affect primarily a few key advanced technology sectors such as computers, telecommunications, precision instruments, and advanced manufacturing equipment—areas where the United States might otherwise have a significant competitive advantage.** In 1986, computing equipment alone made up almost 80 percent of the value of export licenses approved. Thus, while U.S. controls are not the critical factor determining the overall volume of trade with China, delays can considerably affect the advanced technology exports that China wants.

In recent months there have been signs of improved efficiency in license review. Average processing time for China cases has declined to 57 days in April 1987. However, the processing time for referred China cases (those reviewed by agencies in addition to DOC) continues to take almost 6 months on average. OTA found that 134 China cases valued at $145 million had been in the system for more than 1 year as of January 1987. Figures 1 and 2 show the trends in processing time for referred and nonreferred cases. China cases comprise about one-third of the total for all countries pending over statutory limits in 1986.[9]

There are several steps the U.S. Government could take to clarify export control guidelines and improve licensing administration. The process of license review could be made more consistent by expanded

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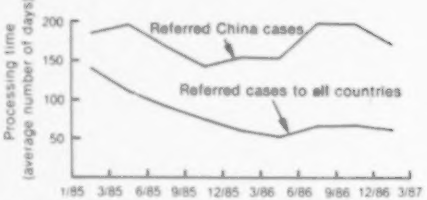
[7] The Coordinating Committee for Multilateral Export Controls, an informal organization of the NATO countries plus Japan, which seeks to harmonize export controls.

[8] OTA's analysis focuses on controls on exports to China. A recent study by the National Academy of Sciences examines the impact of U.S. national security export controls as they affect global competition. *Balancing The National Interest: U.S. National Security Export Controls and Global Economic Competition* (Washington, DC: National Academy Press, 1987).

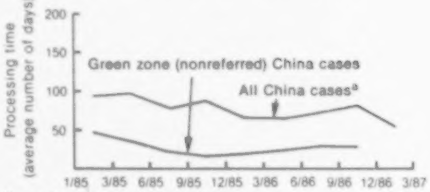
[9] Congress has established deadlines for license processing in the Export Administration Act.

Figure 1.—Processing Time for Referred (Closed Out) Cases



SOURCE: Office of Technology Assessment, 1987

Figure 2.—Average Processing Times: China Nonreferred and All China Cases



[a]Average for (referred and nonreferred) all China cases

SOURCE: Office of Technology Assessment, 1987

use of computerized information on precedent-setting cases. **Additional technical analysis could be applied to develop U.S. positions for an expanded green zone and to develop sectoral approaches for technology transfer to China.** At a broader level, improved mechanisms for resolving disputes among executive branch agencies would reduce processing times for referred cases.

If policymakers wish to relax controls, the key question is whether exports of technologies that are now controlled might endanger U.S. or allied security. **For the near term, there are few dual-use technologies that would make a big difference in China's military capability if transferred.** The discussion of ASW and spectrum analyzers above illustrate how many technologies must be mastered and coordinated to produce usable, sophisticated military systems.

Supercomputers are one of the exceptions. Decisions about such a transfer must take into account a broad array of factors. A supercomputer is useful in a number of defense applications, such as satellite imaging, acoustical intelligence, and nuclear weapons design. China has indigenously developed a supercomputer. It appears to be significantly less capable than the Cray-2 or Cyber 205, but it indicates that China has the expertise to make use of advanced computer technology. However, if an American supercomputer were exported, the Chinese would also need sophisticated software. Programs to simulate weapons design, for example, would not be transferred. Chinese scientists could produce usable software, but it would be years before they produce such sophisticated software as that used in advanced U.S. weapons design. An American (or Japanese) supercomputer would eventually be a significant asset for China for improving its own technology and for solving problems, say, in missile accuracy. If China is allowed to buy a supercomputer (perhaps for weather forecasting as authorized for India), conditions could be applied, such as limiting access to the facility or maintaining some U.S. control to prevent uses detrimental to U.S. interests.

Following the COCOM member country agreement to a liberalization of controls on specific types of exports to China, the number of U.S.-China cases submitted to COCOM declined from 287 in January 1986 to 187 in April 1987. However, the approaches to export controls differ among the COCOM countries, and there is leeway for different interpretations of the China regulations within the discretion permitted COCOM members. **OTA's research indicated a need for further harmonization of COCOM country policies.**

OTA found widespread misunderstanding among businessmen in the United States and abroad about multilateral controls. There is a tendency for all to suspect their competitors of circumventing the rules, but **OTA found little hard evidence to support claims that foreign (COCOM) country governments are doing so.**

A major issue for the future will be whether to remove China exports from COCOM consideration. This would announce full acceptance of China as a Western trading partner, although the commercial implications for U.S. firms are uncertain. If China's current trends continue, this issue will be given serious consideration. However, COCOM members will be cautious because once review is ended, it would be awkward to reinstitute if China's policies later change.

Some exporters have complained that their dual-use technologies are subjected to more stringent controls and take longer to gain approval than military technologies. Sophisticated, state-of-the-art systems such as the F-8 avionics package embody some technology that will be useful to China even if sold as an end product, with no intentional technology transfer. Since the United States has made a policy decision to help China's military to this degree, dual-use exports should be judged by the same standards.

OTA finds that approvals of military and dual-use technology have not been inconsistent. The actual number of munitions cases reviewed has been much smaller than those reviewed for dual-use exports, and the rate of denial higher. Inconsistency could be a problem in the future unless the two sets of reviewers are more aware of what their counterparts are doing. Information about recent arms sales, for example, could be useful to those involved in review of related types of dual-use cases.

A number of factors suggest that U.S.-China military cooperation will continue to develop slowly. Taiwan is one of those factors. China continues to object to U.S. arms sales to Taiwan, while supporters of Taiwan carefully scrutinize the more limited U.S. sales to China. Continued differences over Taiwan may limit U.S.-China military cooperation in practice.

The United States has several promotional programs that support trade with and technology transfer to China, although these programs are not extensive nor coordinated into a comprehensive strategy as are those of Japan, for example. These protocols for science and technology cooperation help set the stage for expanding commercial interaction. The Foreign Commercial Service in the Department of Commerce provides information and assistance to U.S. businesses and helps potential buyers learn of U.S. goods and services. The Dalian Management Center, a training program for Chinese managers, is supported by DOC. The U.S. Government also tries to provide a favorable environment for trade and technology transfer through U.S. official discussions.

U.S. financing programs, including those of the Export-Import Bank, have been comparatively limited and have been guided by the general principle that the private sector should finance exports unless the project is of great national interest or unless a competing foreign bidder is assisted by a national government with subsidized loans. The Overseas Private Investment Corporation (OPIC) has insured more than 20 U.S. investments in China against political risk. Programs of both the Export-Import Bank and OPIC are, however, being scaled back in some areas because of budgetary constraints.

The Trade and Development Program (TDP) has been well received in China. TDP provides project planning services, including feasibility studies. These relatively modest investments can yield significant results. In 1982, for example, a $440,000 TDP feasibility study of a hydropower project led to $20 million in U.S. exports.

Since the United States has no formal aid program to China and because of opposition by some to the use of "mixed credits," which combine official credits and concessional financing, low-cost programs such as those of TDP provide an important tool for U.S. Government support at important early stages of projects.

China is a good test case for U.S. exports, and the U.S. Government could provide more support. U.S. exports to China were lower in 1986 than in 1980. Increases in exports of machinery and equipment were more than offset by decreases in agricultural products. Congressional debates focus on whether the United States can maintain a policy directed at promoting free trade or whether protectionist responses will be forthcoming. Still another possibility would be to develop special bilateral understandings with China. U.S. policies affecting trade and technology transfer to China, however, must be part of an overall U.S. trade policy strategy to be effective over the long term. Technology transfer is a long-term relationship, and the participants could benefit from clear and consistent signals about the direction of government policies.

Specific actions on export control that Congress could consider include the following:

1. improve the efficiency of export control administration:
   - --require Operating Committee reports to Congress on greatly delayed cases;
   - —require more timely information on precedent setting export approvals;
   - —support automated systems to improve the efficiency of review; and
   - —set goals for faster licensing (e.g., 6 days for green-zone cases).
2. modify existing export control policy:
   - —give DOC authority to approve licenses unless *formally* appealed to the President, with automatic approval if cases back up for too long;
   - —require clearer guidelines for prohibited dual-use exports;
   - —require the development of plans for an enlarged green zone;
   - —improve information exchange between munitions and dual-use reviewers; and
   - —establish a distribution license procedure.
3. ensure that U.S. controls are in line with COCOM allies, even if that means dropping unilateral controls.

Potential congressional actions on trade promotion include the following:

1. expand existing programs, including TDP, the Foreign Commercial Service, and official financing;
2. modify existing policy to:
   - —encourage the development of sectoral trade strategies,
   - —review the science and technology protocols and revise government support as appropriate; and
3. initiate an official development assistance program for China.

Technology will continue to be a key element in the expanding U.S.-China relationship, yet one not easily manipulated by governments. Technology transfer can help create a constructive, long-term partnership, but it can also create new and, in some cases, unanticipated problems. Policies aimed narrowly at either the control or promotion of technology transfer to China without consideration of the larger context of U.S.-China relations and Asian security could prove counterproductive.

Related OTA Reports

- *Energy Technology Transfer to China—A Technical Memorandum.* OTA-TM-ISC-30, September 1985. GPO stock #052-003-01007-1; $4.50.
- *Technology Transfer to the Middle East.* OTA-ISC-173, September 1984. GPO stock #052-003-00962-5; $17.00. NTIS order #PB 85-127 744/AS.
- *Technology and East-West Trade: An Update.* OTA-ISC-209, May 1983. NTIS order #PB 83-234 955.
- *Technology and East-West Trade.* OTA-ISC-101, November 1979. NTIS order #PB 80-119 381.
- *Technology and Soviet Energy Availability.* OTA-ISC-153, November 1981. NTIS order #PB 82-133 456.

NOTE: Reports are available through the U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20401-9325, (202) 783-3238; and the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, (703) 487-4650.

NOTE: Copies of the report "Technology Transfer to China" can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, GPO stock No. 052-003-01069-1.

Assessments in Progress as of June 1987

Technology and the American Economic Transition
High-Technology Ceramics and Polymer Composites
Starpower: The U.S. and International Quest for Fusion Energy
Competitiveness of Domestic Copper
Technological Risks and Opportunities for Future U.S. Energy Supply and Demand
Increased Competition in the Electric Power Industry
Technology, Innovation, and U.S. Trade
Superfund Implementation
Seismic Verification of Nuclear Test Ban Treaties
Advanced Space Transportation Technologies
Defense Technology Base
Strategic Defense Initiative: Survivability and Software
Low-Resource Agriculture in Africa
African Development Foundation
Technology and Public Policy To Enhance Grain Quality in International Trade
Monitoring of Mandated Vietnam Veteran Studies
Technology and Child Health
Nontraditional Methods of Cancer Treatment: Science and Policy Issues
The Quality of Medical Care: Information for Consumers
Diagnostic Medical Tests: Impact on Public and Private Policies Toward Health Care
Drug Labeling in Developing Countries—Phase I
Federal Response to AIDS: Congressional Issues
Life-Sustaining Technologies and the Elderly
New Developments in Biotechnology
Infertility: Prevention and Treatment
Mapping the Human Genome
Methods for Locating and Arranging Health and Long-Term Care Services for Persons With Dementia
New Communications Technology: Implications for Privacy and Security
Technology, Public Policy, and the Changing Nature of Federal Information Dissemination
Communications Systems for an Information Age
Science, Technology, and the Constitution in the Information Age
Hospital Information Systems
From Gravel to Gold: Exploring Our Nations Ocean Frontier
New Clean Air Act Issues
Book Preservation Technologies
Sustaining the National Technological Base: Education and Employment of Scientists and Engineers
Educational Technology: An Assessment of Practice and Potential
Safety in the Commercial Aviation and Motor Carrier Industries

(NOTE: For brief descriptions of these studies in progress, see OTA booklet on "Assessment Activities"—available from OTA's Publications Office, 224-8996.)

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Other OTA Publications

List of Publications.—Catalogs by subject area all of OTA's published reports with instructions on how to order them.

Assessment Activities.—Contains brief descriptions of recent publications and assessments under way, with estimated dates of completion.

Press Releases.—Announces publication of reports, staff appointments, and other newsworthy activities.

OTA Annual Report.—Details OTA's activities and summarizes reports published during the preceding year.

OTA Brochure.—"What OTA Is, What OTA Does, How OTA Works."

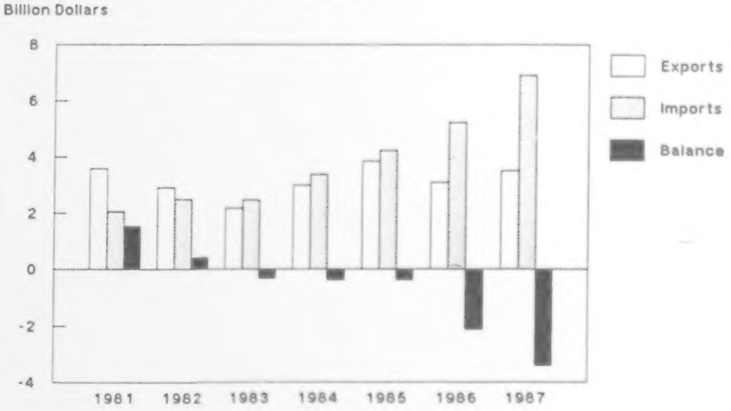
1987
U.S. Foreign Trade Highlights

U.S. DEPARTMENT OF COMMERCE
International Trade Administration

U.S. TRADE WITH THE CENTRALLY PLANNED ECONOMIES: CHINA (PRC)

- The U.S. trade deficit with China increased between 1986 and 1987, from $2.1 billion to $3.4 billion.
- U.S. exports to China rose to $3.5 billion in 1987, 13 percent above the previous year's level of $3.1 billion.
  - -- Large increases in exports of wheat, corn, oilseeds, chemicals, and aircraft were partially offset by reduced machinery sales.
- U.S. imports from China expanded to $6.9 billion in 1987, 32 percent above the 1986 level of $5.2 billion.
  - -- U.S. purchases of miscellaneous manufactures increased more rapidly than any other major commodity category. Imports of apparel, footwear, and toys were particularly strong.
  - -- Crude petroleum imports, which accounted for 18 percent of U.S. purchases from China in 1985, fell in 1987 to $385 million and accounted for only 6 percent of 1987 imports.
- The U.S. trade balance with China shifted from a $1.5 billion surplus in 1981 to a $3.4 billion deficit in 1987 as imports increased while exports declined. U.S. imports grew from $2.1 billion to $6.9 billion while exports decreased from $3.6 billion to $3.5 billion.

U.S. TRADE WITH CHINA
1981-1987



All items in U.S. total exports (F.a.s. value) to China
(Thousands of dollars)

Schedule E commodity / Time period	1983	1984	1985	1986	1987
Total all commodities............	2,173,133	3,004,030	3,851,738	3,105,403	3,488,357
0--Food and live animals..........	540,794	579,239	103,397	21,113	259,771
1--Beverages and tobacco.........	418	1,267	1,236	6,486	6,460
2--Crude materials, inedible,exce	300,067	459,867	568,526	359,695	435,392
3--Mineral fuels, lubrcnts, & rel	496	730	2,192	7,888	6,865
4--Oils and fats, animal and vege	0	7,448	53	2,736	671
5--Chemicals and related products	353,464	644,360	513,320	441,286	808,552
6--Manufactured goods by chief ma	219,752	188,415	370,696	211,098	234,620
7--Machinery and transport equipm	586,767	909,816	1,956,068	1,712,906	1,490,026
8--Miscellaneous mfrd artcls, nsp	165,863	202,429	320,023	325,984	221,987
9--Articles not provided for else	5,511	10,461	16,228	16,212	24,015

Note: Compiled from official statistics of the U.S. Department of Commerce.
NOTE: TRADE DOES NOT INCLUDE SPECIAL CATEGORY EXPORTS.

i.e. military items

Leading items in U.S. total exports (F.a.s. value) to China
(Thousands of dollars)

Schedule E commodity / Time period	1983	1984	1985	1986	1987
Total all commodities..............	2,173,133	3,004,030	3,851,738	3,105,403	3,488,357
792--Aircraft, spacecraft, & associ	234,802	113,782	657,101	295,112	483,944
562--Fertilizers and fertilizer mat	167,701	26[illegible],294	152,167	96,138	270,004
588--Syn resins; rubber and plastic	91,750	234,007	228,613	193,797	254,519
247--Wood,nspf,in the rough,rough s	227,864	271,835	323,445	178,515	164,577
875--Measuring, checking etc instru	139,483	176,143	271,374	248,176	163,720
517--Organic chemicals & related pr	35,113	99,417	89,538	80,701	154,032
752--Auto data proc (adp) machs & a	36,879	77,770	156,930	194,235	151,670
041--Wheat, incl spelt or meslin, u	377,686	575,319	97,009	6,412	139,202
728--Specialized industrial machine	30,967	29,558	121,463	159,256	131,069
641--Paper and paperboard, not cut.	40,728	32,022	26,933	60,525	104,557
044--Corn or maize, unmilled.......	158,140	2,489	0	4,241	94,926
222--Oilseeds,etc,for soft fixed oi	0	59	12,574	19,374	85,895
764--Telecommunications equip nspf.	17,121	24,671	43,103	63,862	84,057
525--Inorganic chemicals & products	15,813	18,944	11,325	36,518	71,837
251--Pulp and waste paper..........	21,389	17,884	19,476	28,015	65,262
723--Civil engineer & contract equi	51,129	136,087	325,411	138,878	60,330
741--Heating and cooling equip (exc	10,603	18,517	41,586	58,958	56,763
736--Metal-working machine tools, p	19,595	16,929	31,842	60,368	53,633
743--Pumps, nspf, compressors, fans	8,256	16,584	36,398	28,475	46,039
653--Fab, wv, mmf inc pile & chen &	3,390	5,559	17,310	22,430	44,348
267--Cellulosic fibs, noncont; and.	4,348	16,086	20,849	40,658	42,819
714--Internal combustion engines, n	30,229	8,759	55,340	56,562	42,707
712--Steam & vapor power units, nsp	9,386	2,418	4,513	5,429	37,986
759--Parts of office machs & adp ma	13,255	21,572	32,246	48,677	35,064
742--Pumps for liquids and parts...	4,235	9,150	41,777	32,370	34,775
711--Steam & vapor generating boile	11,108	8,998	6,809	11,790	33,582
774--Electro-medical & radiological	19,256	27,990	32,694	39,707	27,864
541--Medicinal and pharmaceutical p	1,388	2,026	2,573	5,277	24,399
282--Iron and steel, waste and scra	177	21,189	32,793	28,506	23,682
266--Noncell fibs, noncont; mmf crd	24,483	79,563	97,823	11,949	21,261
778--Electrical machinery & apparat	11,962	14,012	25,199	34,940	20,944
724--Textile and leather working ma	3,267	9,104	17,918	13,717	20,282
784--Bodies and chassis, motor vehi	8,645	11,031	16,055	15,264	20,151
737--Metal-working machinery, nspf,	4,471	5,543	21,498	70,835	19,913
598--Miscellaneous chemical porduct	7,047	9,591	16,285	17,835	19,006
611--Leather.......................	25,789	39,449	62,536	31,151	18,007
061--Sugar, sirups, molasses and ho	0	0	24	2	15,636
990--Under $251 entries, estimated.	2,237	7,383	10,937	10,963	14,693
744--Mechanical handling equipment.	13,778	6,348	19,692	13,211	13,550
892--Printed matter................	10,405	5,772	13,071	30,867	13,291
Total of items shown...............	1,897,870	2,440,857	3,194,229	2,493,696	3,179,996
Total other........................	275,263	563,172	657,509	611,707	308,361

Note: Compiled from official statistics of the U.S. Department of Commerce
NOTE: TRADE DOES NOT INCLUDE SPECIAL CATEGORY EXPORTS.
Top 40 commodities sorted by total exports, F.a.s. value in 1987.

All items in U.S. general imports (C.i.f. value) from China
(Thousands of dollars)

Schedule A commodity / Time period	1983	1984	1985	1986	1987
Total all commodities............	2,476,774	3,381,157	4,224,242	5,240,517	6,910,501
0--Food and live animals..........	123,750	156,346	174,349	210,500	293,030
1--Beverages and tobacco..........	5,360	5,605	7,444	11,187	11,719
2--Crude materials, inedible,exce	118,799	135,801	150,315	127,468	174,491
3--Mineral fuels, lubrcnts, & rel	468,497	655,897	1,052,675	718,839	530,138
4--Oils and fats, animal and vege	1,112	2,486	1,105	1,328	3,059
5--Chemicals and related products	145,042	171,598	177,311	193,136	216,469
6--Manufactured goods by chief ma	430,756	626,197	715,574	839,418	1,136,705
7--Machinery and transport equipm	45,618	71,073	96,923	152,351	499,140
8--Miscellaneous mfrd artcls, nsp	1,127,057	1,533,623	1,805,002	2,898,165	3,967,738
9--Articles not provided for else	10,784	22,531	43,545	88,127	78,011

Note: Compiled from official statistics of the U.S. Department of Commerce.

Leading items in U.S. general imports (C.i.f. value) from China
(Thousands of dollars)

Schedule A commodity / Time period	1983	1984	1985	1986	1987
Total all commodities..............	2,476,774	3,381,157	4,224,242	5,240,517	6,910,501
894--Baby carriages, toys etc & spo	21,989	130,149	287,337	411,556	783,078
843--Outwear app, cot, wool, mmf, n	327,432	389,790	361,895	699,478	745,010
845--Sweaters & ot o wear app texti	103,410	127,410	199,964	491,667	584,069
658--Made up articles of textile ma	84,263	136,894	197,577	245,394	385,918
333--Crude petroleum...............	84,969	249,017	758,086	528,516	385,047
831--Luggage, handbags & similar ar	45,660	104,310	156,724	206,666	323,748
842--Outer gar, (ex shirts) tex nk,	168,991	168,223	166,402	225,203	310,234
899--Manufactured articles nspf....	117,137	147,487	145,240	139,694	197,230
846--Undergarments, knit...........	76,894	101,126	78,581	181,641	175,213
844--Shirts,m&b; u wear etc mb&wgi.	84,087	94,690	113,226	127,362	163,958
851--Footwear,new,exc military or o	38,220	48,332	61,251	83,773	156,700
848--Weap ap & acc lea, fur, tex ns	40,704	75,112	76,720	93,763	144,300
334--Petroleum products............	383,482	406,476	290,230	182,001	136,674
896--Artworks, collectors pieces &.	27,948	52,842	52,215	103,382	126,668
652--Fab, cotton, woven, exc spec o	80,403	126,808	108,360	167,813	125,823
762--Radio receivers (am & am/fm) &	6,940	21,809	27,350	32,414	119,780
036--Shellfish, fresh, frozen, salt	5,851	13,176	22,394	65,361	119,662
775--Household type equipment, nspf	660	3,074	11,504	33,342	102,302
659--Flr covr, tapestries & arti ve	66,262	96,303	93,347	95,832	98,908
764--Telecommunications equip nspf.	2,732	5,800	7,036	23,121	80,213
666--Pottery.......................	40,841	46,673	41,666	50,179	79,034
056--Veg,roots & tubers,nspf,prep o	43,576	61,712	62,083	56,039	75,984
821--Furniture & parts thereof.....	30,163	34,311	34,650	40,903	69,060
891--Articles of rubber or plastics	5,517	11,002	16,813	27,495	57,197
687--Tin and tin alloys, wrought an	24,120	21,155	62,901	20,423	57,025
291--Animal materials,nspf, crude..	22,434	28,087	28,595	38,392	55,843
694--Nails, scrws & othr fastners o	33,706	40,331	39,312	27,048	52,933
931--Special transactions nspf.....	6,561	16,819	27,273	69,547	51,934
572--Explosives and pyrotechnic pro	33,414	35,399	42,179	48,169	51,175
517--Organic chemicals & related pr	35,961	46,295	36,222	46,574	47,142
778--Electrical machinery & apparat	1,390	2,677	5,476	10,087	41,127
699--Manufctrs & semi-mfrs, base me	9,291	12,724	17,862	23,344	39,344
278--Crude minerals, nspf..........	47,100	57,032	52,563	28,233	39,013
695--Tools, for hand or machine use	15,710	20,158	20,663	23,817	37,725
847--Clothing accessories of textil	22,686	26,506	30,502	30,021	37,695
763--Phonos, tv image & sound repro	205	1,199	884	3,732	36,384
526--Inorganic chemicals & compound	13,110	30,493	36,606	31,782	35,476
287--Ores & concentrates, of base m	11,265	16,054	31,199	23,977	32,039
654--Fab, wov, of tex fibs, ex cot.	21,953	30,994	24,062	21,696	31,426
541--Medicinal and pharmaceutical p	24,775	22,921	27,102	26,678	29.577
Total of items shown...............	2,211,812	3,061,371	3,854,051	4,786,115	6,221,665
Total other........................	264,962	319,786	370,191	454,402	688,836

Note: Compiled from official statistics of the U.S. Department of Commerce.
Top 40 commodities sorted by general imports, C.i.f. value in 1987.

THE CHINA MARKET

THE TRADE PICTURE

The U.S.-China trade balance shifted from a $1.5 billion surplus in 1981 to a $3.4 billion deficit in 1987.

Exports: Machinery and transportation equipment ($1.5 bill)
Chemicals, fertilizers, synthetics ($747 mill)
Commercial aircraft ($477 mill)
Agricultural products ($370 mill)

Imports: Apparel and textiles ($2.75 bill)
Footwear and toys ($1.26 bill)
Crude oil and petroleum products ($567 mill)
Food items ($238 mill)

China's Trading Partners

Hong Kong and Macao - 27% market share
Japan - 20% market share
U.S. - 9.5 % market share

Trading Problems

China criticizes: U.S. textile import limits, antidumping restrictions, export controls on high technology.

U.S. criticizes: restrictive regulations and bureaucratic rigidities, difficulty in obtaining foreign exchange, non-tariff import barriers.

U.S. Government Aid

Direct assistance to American companies through:
- U.S. Embassy Foreign Commercial Service Officers
- U.S. Commerce Department International Trade Administration
  - Industrial and Technology Cooperation Accord for small and medium sized businesses
- Trade and Development Program
  - funds fesibility studies for U.S. entry to Chinese projects
- U.S. Export-Import Bank
- Overseas Private Investment Corportation

1979 Science and Technology Agreement
Facilitated commercial transactions and improved political contacts in key sectors, including telecommunications, agriculture, space, environmental protection, transportation, and student exchange.

THE INVESTMENT PICTURE

Although investors increasingly view joint ventures as a good opportunity to tap the China market, problems plague many projects, including foreign exchange availability, quality control, labor productivity, and intellectual property protection.

China's Investment Partners

Hong Kong and Macao - $14.26 billion (65%)
U.S. - $3.04 billion (13.8%)
Japan - $1.9 billion (8.7%)

U.S. Investment in China

Year-end 1987: 407 U.S.-China joint ventures totaling $2.1 billion; U.S. offshore oil development totaling $940 million. U.S. investment projected to increase 30% in 1988 to $3.9 billion (14%).

Types of Investments

Joint ventures (80% contractual, 20% equity), licensing, technology transfer.

Major Selected U.S.-China Equity Ventures

American Motors	- manufacture of jeeps
Babcock & Wilcox	- production of power station boilers
Bechtel	- engineering and construction projects
Corning	- design, sale & manufacturing of glass
General Foods	- producing coffee and breakfast drinks
Hewlett-Packard	- electronic measuring and survey instr
M.W. Kellogg	- eng. and const. for oil industry
R.J. Reynolds	- manufacturing cigarettes
Smith Kline Beckman	- pharmaceutical products
Wang	- producing office systems

Major Selected Contractual Joint Ventures

Armand Hammer	- Antaibao open pit coal mine
McDonnell Douglas	- MD-82 twinjet transports

Future Outlook

The China market is a vast commercial frontier, with one quarter of the world's population and at the center of the fastest growing region in the world. Although problems for foreign investors exist, the country's leadership appears eager to improve matters. China's ambitious goals, including a quadrupling of the 1980 industrial and agricultural output by year 2000, make it an attractive market for future commercial development. In addition, China remains a testing ground for American competitiveness in the developing nations.

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Foreign Economic Trends and Their Implications for the United States

AUGUST 1988

PEOPLE'S REPUBLIC OF CHINA

FET 88-84
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PEOPLE'S REPUBLIC OF CHINA: KEY ECONOMIC INDICATORS

	1986	1987	1988 Projection
Domestic Economy 1/			
Population (millions)	1,065	1,080	1,096
Natural Rate of Population Growth (%)	1.4	1.4	1.5
Official Unemployment (avg. % for year) 2/	2.3	2.0	2.0
GNP (billion yuan)	938	1,092	1,365
Real GNP Growth (%)	7.8	9.4	10
GNP Per Capita (yuan)	881	1011	1267
Real Per Capita GNP Growth (%)	6.3	7.8	8.4
National Income (billion yuan)	778	910	1144
Real National Income Growth (%)	7.6	9.3	10
Gross Value Indus. Output (billion yuan) 3/	1119	1378	1816
Real Growth GVIO (%)	11.0	16.5	17
Industrial Productivity Growth (%)	6.3	7.6	8
Gross Value Agric. Output (billion yuan) 3/	401	465	511
Real Growth GVAO (%)	3.4	4.7	5
Retail Sales (billion yuan)	495	582	719
Real Growth Retail Sales (%)	8.3	9.0	10
Total Fixed Asset Investment (billion yuan)	302	353	440
Real Growth Fixed Asset Investment (%)	11.9	9.2	10
Domestic Finance			
General Retail Price Index (CPI) (% change)	6.0	7.3	10
Market Price Index (% change)	8.1	16.3	20
Domestic M-2 Money Supply (billion yuan)	720	899	1120
M-2 Growth Over Prior Year-End (%)	29.3	23.4	25
Govt. Budget Surplus/Deficit as % of GNP	-1.9	-1.0	-2.0
Balance of Payments ($ billions)			
PRC Exports (FOB)	30.9	39.4	45.0
PRC Imports (CIF)	42.9	43.2	54.0
Trade Balance	-12.0	-3.7	-9.0
Current Account Balance	-8.2	-0.3	-5.0
Foreign Direct Investment (paid in)	1.9	1.9	3.0
Foreign Debt, year end (estimated)	20.0	27.0	32.0
Debt Service Paid (estimated)	2.4	3.0	4.0
Debt Service Ratio (% of exports)	7.8	8.3	8.8
Foreign Exchange Reserves (year-end)	10.5	15.2	17.0
Average Exchange Rate for Year (yuan/$) 4/	3.46	3.72	3.72
U.S.-China Trade and Investment ($ millions) 5/			
U.S. Exports to China (FAS)	3,106	3,497	4,300
U.S. Imports from China (CIF)	5,241	6,911	8,500
U.S.-China Trade Balance	-2,135	-3,414	-4,200
U.S. Share of Chinese Exports (%)	17.7	18.4	18.0
U.S. Share of Chinese Imports (%)	7.8	9.8	10.0
U.S. Investment (Cumulative, approved)	2,700	3,060	3,800
U.S. Share of Total Foreign Investment (%)	18.1	13.8	10

Sources: State Statistical Bureau (SSB) Yearbook and Annual Statistical Communiques on Economic Performance, People's Bank of China Banking data, Ministry of Finance Budget Reports, SSB trade data, and Embassy estimates.

Notes:

1/ All yuan are current yuan. Growth rates are adjusted for inflation.

2/ 1987 is Embassy estimate. Official figure is not yet available.

3/ In accordance with the material product system (MPS) of national income accounting, GVIO and GVAO figures are calculated on a gross rather than a net basis. They are not directly comparable with GNP and national income figures which are calculated on a value added basis.

4/ Figures do not reflect the price of foreign exchange sold at domestic adjustment centers (swap markets), which currently is about 5.20 yuan/$.

5/ Except for projections, investment data are based on official Chinese sources. U.S.-China bilateral trade is based on U.S. Government data.

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China's new export-led growth strategy, and the further decentralization of foreign trade, exchange control, and investment approval authority could generate greater opportunities for U.S. businesses. U.S. raw materials and some equipment suppliers should be very competitive in light of the appreciation of the major Asian and European currencies. Nevertheless, serious obstacles remain to trade and investment including administrative controls over imports, restrictions on the use of foreign exchange, and an unpredictable legal and regulatory environment for foreign investment.

CURRENT ECONOMIC SITUATION AND TRENDS

GNP and Industrial Output: Growth Exceeds Targets

The pace of economic activity picked up in 1987. GNP reached 1.092 trillion current yuan--an inflation adjusted 9.4 percent increase over 1986. National income was up 9.3 percent in real terms to 915.3 billion current yuan. Rapid GNP growth was fueled primarily by a high industrial growth rate. The gross value of industrial output (GVIO) was up 16.5 percent in real terms--more than double the planned growth of 7 percent. Pacing industrial growth once again was a buoyant collective sector and a small but growing private sector. Inflation adjusted output of the smaller collective and private sectors were up 25 and 48 percent, respectively, while that of the dominant state sector industries grew only 11 percent. Output of foreign joint ventures jumped an impressive 98 percent. The growth of light and heavy industrial output remained relatively balanced at 16.8 percent and 16 percent, respectively. After slowing somewhat in the fourth quarter of 1987, the industrial growth rate surged again to hit 16.7 percent in the first quarter of 1988.

Enterprise Efficiency Up

Continuing a trend which began in the fourth quarter of 1986, enterprise efficiency improved in 1987. Average productivity of industrial workers rose 7.6 percent against a 4 percent increase in 1986. State sector enterprise profits and tax payments were up 9.9 percent against a 0.2 percent increase in 1986. The enterprise contract management system, now implemented in 82 percent of China's state industrial enterprises, may be partly responsible for this trend, but it mostly reflected recovery of industrial output as enterprises rebounded from the dislocations of early 1986. Perhaps reflecting tightened credit conditions and continuing problems in the energy sector, productivity growth slowed in the fourth quarter of 1987, although it picked up again to a 7.5 percent annual rate in the first quarter of 1988.

Energy, Transportation, and Raw Materials Bottlenecks

Growth in the energy, transportation, and raw materials sectors lagged overall industrial growth and these sectors continued to constitute major bottlenecks to economic growth. Coal production rose only 2.9 percent to 920 million metric tons in 1987 and crude oil output was up just 2.6 percent to 134 million metric tons. (Coal and petroleum account for over 90 percent of total commercial energy production in China.) Electricity generation capacity increased 8.1 million kw and output was up 10.3 percent to 496 billion kwh last year, however. Since China depends mostly on coal and oil to fire its power plants, even assuming strong gains in generating efficiency, it is likely that coal stockpiles were further drawn down in 1987. Despite domestic shortages, China continued to export large amounts of crude oil and coal in 1987. Coal exports increased 42 percent over 1986 to exceed 14 million tons, a trend likely to continue. Oil exports were down 4.5 percent from 1986 levels to 27 million tons, in reaction to soft world market prices. In the first quarter of 1988, the volume of coal and oil exports both rose moderately. Recently, China's new Energy Minister outlined a major shift in China's energy strategy toward increased reliance on nuclear power. Even under optimistic assumptions, however, nuclear power will make only a limited contribution to total energy output by the end of the century.

Total transportation freight volume rose 9.2 percent to 2.19 trillion ton-km with rail, highway, and water-borne freight volume rising 8.2 percent, 13.7 percent, and 9.8 percent, respectively. Total port capacity rose only 3.3 percent to 397 million tons, despite the fact that, together with rail transport, it was one of two priority areas in the 1987 state investment plan. Rail expansion projects are again on the list of critical investments for 1988, with emphasis on expanding coal hauling capacity. Output of critical raw materials like steel, iron ore, cement, and lumber also lagged behind the overall growth in industrial output. Iron and steel, nonferrous metals, and chemicals are priority sectors under the 1988 plan. Imports of steel and copper fell in the first quarter of 1988 while iron ore, lumber, and chemical imports increased, at increasing cost to the state budget. To control demand for energy, transportation, and raw materials, Beijing has announced that, in 1988, banks will refuse loans for out-of-plan investments for which supplies of these critical inputs are not available.

Agriculture: Recovering But Problems Remain

The gross value of agricultural output (GVAO) was up 4.7 percent in inflation adjusted terms, a solid improvement over the 3.4 percent real growth registered in 1986 and above the 4 percent target growth rate. At the same time, however, there were serious shortages of pork, eggs, vegetables, and sugar, the sales of which through state retail outlets had to be rationed in large numbers of cities. At 402 million tons, grain production was up only 2.8 percent over 1986. Although within the target range of 400-405 million tons, the harvest was still below the record of 407 million tons set in 1984. Grain production is targeted at 410 million tons in 1988. Chronic problems in agriculture can be traced to failure to raise prices paid to farmers and to underinvestment in agricultural infrastructure. Under the 1987 annual economic plan, state investment in agriculture was to increase nearly 40 percent to 2.375 billion yuan, but actual 1987 investment in agricultural infrastructure accounted for only 3.4 percent of total state capital construction investment. Low contractual purchase prices for grain encouraged farmers to shift their efforts into rural industries, contributing to excessive growth in industrial output and placing strains on raw materials supplies. After several years of exporting grain, China once again turned to imports in 1987 to supplement domestic shortfalls. Net grain imports were up sharply in the first quarter of 1988. Recently, China announced that prices for pork, eggs, sugar, and vegetables charged by state run outlets would be raised to approximately the market price. Prices were hiked by as much as 60 percent, accompanied by compensatory cash subsidies to urban residents.

Consumption and Investment: Better Controlled

The 1987 annual economic plan targeted the growth of urban wages (including bonus payments) and peasant incomes at or below the rate of growth of productivity in the industrial and agricultural sectors, respectively.

Furthermore, the 1987 plan stipulated that nominal investment demand would be held flat and capital construction investment cut 5 percent--both significant drops in real terms. By the second and third quarters of last year, urban wage growth in state sector enterprises had indeed been reduced to the rate of growth of industrial productivity, but a spurt in wages in the fourth quarter and a dip in productivity growth once again placed this long-pursued goal out of reach, as wages of state sector workers grew 9.3 percent while their productivity rose only 6.2 percent. Large worker bonuses, due in mid-1988 for fulfillment of production and profit targets under last year's enterprise management contracts, make it even less likely that 1988 state sector wage growth can be held below the rate of growth of productivity. Data on collective sector wages and productivity are spotty, but indicate that productivity growth has comfortably exceeded wage increases since early 1986. This last fact and a campaign to discourage institutional consumption held the growth of inflation adjusted retail sales to 9.6 percent in 1987, roughly in line with the 9.4 percent increase in real GNP. Continuing administrative restrictions and taxes on "extra-budgetary" investment in "nonproductive" projects also slowed growth of total fixed asset investment spending to 16.5 percent in 1987. After correcting for inflation, this represents an estimated 9.2 percent increase, although some analysts put the real increase as low as 6 percent. In the first quarter of 1988, real investment by state sector enterprises showed no growth over the same period of 1987, and real retail sales increased approximately 10 percent.

Foreign Trade and the Current Account: Nearly in Balance

As a result of a vigorous export drive and continuing efforts to control imports, demand from the foreign trade sector, while still small in relative terms, grew rapidly, as net imports fell sharply from $12 billion in 1986 to $3.7 billion in 1987 (exports were $39.5 billion in 1987 and imports $43.2 billion). While China narrowed its trade deficit considerably, both imports and exports increased, and some categories of imports showed strong growth. Chinese customs data show imports led by heavy industrial goods (over half of the total) followed by light industrial products, petrochemical products, industrial raw materials, and food items. China's largest exports were textiles, apparel, and light industrial products (45 percent of the total) followed by heavy industrial goods, food items, fuels and minerals, industrial raw materials, and petrochemicals. Hong Kong/Macao surpassed Japan this year as China's largest trade partner, accounting for 27 percent of China's total two-way trade. Japan was second at 20 percent and the United States third at 9.5 percent. As measured by Chinese customs data, the United States took 7.7 percent of China's exports and supplied 11.1 percent of its imports. The U.S. trade surplus of $668 million calculated using Chinese statistics conflicts with a U.S. trade deficit according to U.S. Customs figures. Solid performance in merchandise trade combined with continued strong service income from tourism led to near balance in China's current account, which showed only a $310 million deficit in 1987.

Capital Account--Foreign Investment, External Debt, and Reserves

The total value of 1987 contractual foreign investment commitments was $3.68 billion--30 percent above last year's level. This brought 1987 year-end cumulative commitments to $21.96 billion. Excluding Hong Kong and Macao (at $14.26 billion or 65 percent), the United States has accounted for the largest share of this at $3.04 billion or 13.8 percent, followed by Japan at $1.9 billion or 8.7 percent. Actual paid in investment was relatively flat last year at $1.9 billion, reflecting a slower pace of commitments in prior years. As policies to slow the growth of fixed asset investment began to take effect, borrowing demand, particularly for extra-budgetary investments by localities, was reduced. China prepaid some outstanding Japanese yen denominated obligations. Net borrowing for 1987 was only $2.9 billion, bringing total outstanding foreign debt to $27.4 billion. In 1987 China's estimated debt service ratio as a percent of exports was a relatively low 6.3 percent. In recent years, China has relied increasingly on commercial sources for borrowing--principally, bond issues and syndicated bank loans, and all indications are that this trend will continue as greater use is made of U.S. and European credit markets. China's total year-end foreign exchange reserves hit their highest level since mid-1984 at $15.2 billion up by some $4.7 billion last year. Preliminary first quarter figures put foreign exchange reserves at over $16 billion.

Government Budget Deficit

China's official 1987 government budget deficit, calculated according to IMF methodology, was 17.1 billion yuan or 1.6 percent of GNP, up slightly from the 16.7 billion yuan deficit reported in 1986 but well below the 20.4 billion yuan deficit budgeted for 1987. Greater enterprise tax and profit remissions were offset by increased food subsidies for urban residents and higher subsidy payments to cover enterprise losses. China's budget deficit was financed with 5.1 billion yuan worth of net foreign borrowing, net issuance of 4 billion yuan of domestic bonds by the Ministry of Finance, and 8 billion yuan of overdrafts from China's central bank, the People's Bank of China (PBOC). Chinese banking data indicate, however, that on a cash basis, net lending by the central bank to government financial departments increased approximately 15 billion yuan in 1987. This would put the 1987 deficit in the range of 24 billion yuan or 2.2 percent of GNP.

Monetary Policy

Temporary administrative measures adopted by the PBOC in the fourth quarter of 1987 slowed year-end M-2 money supply growth to 23.4 percent over the same period of 1986. (M-2 is a broad measure of money supply comprising currency in circulation and the demand and time deposits of households, enterprises, and official institutions and organizations.) These measures included raising the state specialized bank reserve requirement on deposits from 10 to 12 percent, increasing the PBOC relending rate to specialized banks from 6.48 to 7.2 percent, and recentralizing a large amount of the deposits of rural credit cooperatives. Total outstanding loans increased 20.2 percent and cash in circulation grew 19.4 percent in 1987. While still high, these growth rates were well below expectations, given the high growth rates seen over the first three quarters. Individual savings continued to grow rapidly, however, up 37.2 percent in 1987 and, as noted above, lending to the budget increased. As individual savings have few restrictions placed on them, their continued growth represents a serious inflationary threat. Moreover, preliminary indications in the first quarter of 1988 are that monetary policy was again loosened, allowing high credit growth to resume.

Inflation Accelerating

Pressures from the foreign trade sector, China's budget deficit, and excessive money and credit growth led to a resurgence of inflation. After slowing to less than a 5 percent annual increase in the second quarter of 1986, the market price index rose steadily, until at the end of 1987, it was rising at a 19.6 percent annual rate. Prices for food items, which account for over 50 percent of the average urban household budget, rose even more rapidly. In the first quarter of 1988, food and vegetable prices in China's large and medium-sized cities were up 24.2 and 48.7 percent, respectively, over the same period of 1987. The benchmark nationwide retail price index, which includes many items sold at state-fixed prices, was rising at an 11 percent annual rate in the first quarter of 1988. The State Statistical Bureau (SSB) reported that real per capita income in urban areas rose only 1.7 percent in 1987 as against a 5.3 percent increase in the countryside. According to the SSB, 21 percent of urban households experienced a decline in their real income, while about 10 percent, with no savings or discretionary income to cushion the inflationary pressure, suffered declining living standards.

Economic Prospects for 1988

The 1988 state economic plan calls for an increase of 7.5 percent in real GNP, 8 percent for industrial output, and 4 percent for agricultural output. Given present growth rates, Embassy believes real GNP will grow at 10 percent, industrial output 17 percent and agricultural output 5 percent. Productivity growth should increase slightly as the industrial growth rate rises. Annual grain production is targeted to reach 410 million tons and this may be attainable if grain purchase prices are raised this year. The plan calls for investment demand to be reduced 6.2 percent in nominal terms to 330 billion yuan, which implies a substantial real decline, assuming a positive inflation rate. Over half of budgeted government investment allocations and loans will go to support energy and transportation projects. Given the impact of economic decentralization, however, it is unlikely that the central government will be able to hold investment to zero real growth let alone zero nominal growth. Real retail sales will likely continue to grow by roughly 10 percent annually in 1988. The pace of export growth will likely slow somewhat this year to around 15 percent, although we expect solid growth in light manufactured exports as new foreign trade reforms take effect. Growth of raw materials exports should be down, reflecting increasing domestic shortages. Imports are projected to rise this year by as much as 25 percent, as China seeks to alleviate these domestic supply shortages and expand productive capacity of export industries. Foreign investment commitments are projected to increase 25 percent in response to expected future improvements in the investment climate, and paid-in investment should pick up as well. (First quarter 1988 commitments were up 40 percent over a year earlier.) Net borrowing should increase slightly over 1987 levels, reflecting the projected deterioration in the current account, although continued restraint on investment demand and an adequate level of reserves should reduce pressure to borrow somewhat. The debt service ratio will likely rise, however, as scheduled repayment obligations on outstanding loans increase. We expect foreign exchange reserves to increase slightly to over $16 billion.

China's 1988 budget deficit is officially projected to rise to 21 billion yuan mostly due to a surge in projected subsidy payments and increased spending on education, health, and culture and on agriculture. Assuming the planned growth rate of 7.5 percent for real GNP and a highly optimistic 6 percent inflation rate, the officially projected deficit would be in the range of 1.7 percent of GNP. Given present trends, however, believe a figure of 2.3 percent of GNP to be more realistic. This estimate incorporates both projections of higher nominal GNP growth and higher deficits. Despite frequent exhortations to control financial aggregates, the M-2 money stock will likely continue to increase at least 25 percent annually, as China's central bank will likely try to accommodate the cost push inflation caused by adjusting prices of agricultural products, raw materials, and consumer goods. Inflation, as measured by the benchmark retail price index, should hit at least 15 percent in 1988, reflecting both the impact of price adjustments and excess credit creation over the past year. Market prices will likely rise at a much higher rate. Continuing high inflation makes it likely that the official renminbi exchange rate of 3.71 yuan/$Y will be devalued somewhat during 1988, although the recent establishment of foreign exchange adjustment centers (swap markets) for informal but officially sanctioned trading of foreign exchange at market-related rates (now about 6 yuan/$Y) may delay this adjustment.

Economic Reform in 1987 and Future Prospects

Last year started out on a down note for the economic reform program. Dissatisfaction over Hu Yaobang's handling of late-1986 student demonstrations contributed to his ouster as Communist Party General Secretary in early 1987 and led to a short-lived campaign to oppose "bourgeoise liberalization." While existing economic reforms were not directly challenged, the ensuing political chill put many of the more innovative reform experiments on hold. At the same time, growing concern over inflation led to a cautious approach on price reform. Prices of many out-of-plan raw and intermediate materials were recontrolled and rationing was instituted on some food and consumer items sold in state-owned outlets in major cities. Other controversial reform experiments were delayed or curtailed, with emphasis placed instead on microeconomic management reforms and efforts to reform China's enterprise-based welfare system.

The Thirteenth National Congress of the Communist Party, held in October, proved to be a major turning point, however, by providing strong ideological justification for further market-oriented economic reforms. Party Congress delegates endorsed such previously controversial concepts as privately-owned enterprises (employing more than eight people) and the sale and leasing of state-owned enterprises and land rights during what was called the "primary stage of socialism" in China. A younger and more pragmatic leadership lineup was also installed. Encouraged by the results of the Party Congress, former Premier and newly elected Communist Party General Secretary Zhao Ziyang announced, in January 1988, a new export-led development strategy aimed at integrating China's coastal areas into the world economy through international trade and investment. A further decentralization of China's foreign trade system was announced in March 1988, with a substantial reduction in the scope of the state command export plan and a loosening of restrictions on the spending of foreign exchange. Henceforth, Chinese enterprises will be able to trade their retained foreign exchange through adjustment centers at market-determined rates. Hainan Island has been declared a Special Economic Zone (SEZ) with the most liberal policy environment seen in China to date and the open coastal area was roughly doubled.

At the apparent insistence of paramount leader Deng Xiaoping, China's leadership has recently announced that it intends to implement a comprehensive package of market-oriented reforms including a thoroughgoing reform of the existing price and wage systems and elimination of commodity price subsidies. Prices of meat, eggs, sugar, and vegetables have already been raised to market levels, accompanied by modest cash subsidies to urban residents. Over the next few years, we expect to see the prices of grain, energy, raw materials and manufactured goods adjusted in steps and then released to the market. Such steps imply both strong gains in economic efficiency and higher inflation. Though requiring politically sensitive restrictions on local governments' power, major changes to the fiscal and monetary systems will likely accompany price reforms to ensure sufficient macroeconomic control.

IMPLICATIONS FOR THE UNITED STATES

1987 U.S.-China Trade A Best Prospects

U.S. Customs data on China's exports to and imports from the United States, show a U.S. deficit of $3.4 billion in 1987, up from the $2.1 billion deficit reported in 1986. (The discrepancy with Chinese bilateral trade statistics, which show a U.S. trade surplus, lies in the differing classification of Chinese exports transshipped through Hong Kong.) According to U.S. data, U.S.-China two-way trade increased 25 percent to $10.4 billion in 1987, making China the 13th largest U.S. trading partner (up from 15th place last year). U.S. imports from China were up 32 percent to $6.9 billion and exports to China, reversing 1986's decline, rose 12 percent to $3.5 billion. The United States took 16.3 percent of China's exports in 1987 (up marginally from 15.7 percent in 1986) and supplied 8.8 percent of China's imports (up from 7.8 percent in 1986). Reflecting the realignment of the world's major currencies, we expect U.S. exports to China to increase by as much as 50 percent in 1988, while U.S. imports from China should increase by roughly 20 percent. Under these projections, the U.S. share of China's imports would rise to 10.9 percent while the U.S. share of China's exports would remain flat at 16.2 percent.

Although declining 13 percent in value terms over 1986 levels, machinery and transportation equipment were still the most important U.S. exports to China at $1.490 billion. Following that were chemicals, fertilizers, and synthetic rubber/resins/plastics ($747 million); commercial aircraft and aircraft parts ($477 million); agricultural items ($370 million); scientific control instruments ($169 million); computers ($152 million); and power generating machinery ($128 million). Textiles and apparel topped the list of U.S. imports from China, increasing 15 percent in value terms over 1986 to $2.75 billion. This was followed by light industrial products (travel goods, handbags, footwear, toys, games, and sporting goods) at $1.26 billion, crude oil and petroleum products ($567 million), food items ($238 million), metal manufactures ($160 million), art and antiques ($127 million), and nonferrous metals ($104 million).

Preliminary U.S. data for the first 4 months of 1988 show the trade deficit with China decreasing slightly as both exports and imports were up strongly. China's major needs and purchases during the next 1 to 2 years will be in commercial aircraft and parts, fertilizer, wheat, chemicals and petrochemicals, power generating machinery, pollution control equipment, process control instruments, raw material extraction equipment, and telecommunications equipment. U.S. imports of crude petroleum; metal manufactures; nonferrous metals; travel goods and handbags; footwear; and toys, games, and sporting goods should continue to increase. We expect the value of imports of clothing and accessories to rise as quality of production improves, although imports actually fell in the first 4 months of 1988, as compared with the same period in 1987.

U.S. Investment in China

U.S. firms in China have licensing, technology transfer, equity joint venture, and coproduction agreements. Chinese Government estimates for year-end 1987 show 407 U.S.-China joint ventures in China, totaling $2.1 billion in pledged American investment. U.S. offshore oil development has pledged another $940 million. Total U.S. investment commitments are projected to increase approximately 30 percent in 1988. The United States has a bilateral tax treaty with China, but negotiations on a bilateral investment treaty have been stalled over Chinese unwillingness to provide meaningful guarantees for U.S. investors.

China's Business and Investment Climate: Prospects and Problems

China's new export-led growth strategy, and its increasing decentralization of foreign trade, exchange control, investment approval, and to a lesser extent borrowing authority have profound implications for U.S. trade and investment. These policies could generate greater export opportunities for U.S. businesses supplying raw materials and some kinds of productive equipment to China's expanding export industries. U.S. suppliers should be very competitive in light of the appreciation of the major Asian and European currencies against the renminbi. (At present, the renminbi is effectively pegged to the U.S. dollar.) The investment climate should also continue to improve gradually, as China seeks to attract greater levels of export-oriented investment into the coastal areas.

Nevertheless, serious obstacles remain to both trade and investment. China has put in place a complex system of market and administrative controls which restrict foreign firms' access to the domestic market. Market controls include tariffs and import regulatory taxes; administrative controls include import and export licensing, import substitution regulations, and foreign exchange restrictions. During 1987 and early 1988, with the exception of foreign exchange controls which have been relaxed somewhat, import restrictions have been tightened further. China also restricts foreign activities in service businesses, including shipping, insurance, banking, accounting, and legal services. This year, China is considering a plan which would allow foreign insurance companies and banks to compete to provide services to joint ventures operating in the new Hainan Island Special Economic Zone, and foreign banks will be permitted to make some domestic currency loans to joint ventures on an experimental basis, but real opportunities remain limited. While progress has been made in establishing a regime for the protection of intellectual property, a number of deficiencies remain.

China's foreign investment climate has improved, but foreign exchange shortages and restricted access to the domestic market remain major impediments. From time to time, serious disputes also arise on a broad range of operational issues, including customs duties, labor practices, and export quotas. China's imperfect and often arbitrary legal and regulatory regimes pose a constant challenge to foreign investors. Hopefully, further progress can be made on all of these issues, particularly as China has applied to participate in the General Agreement on Tariffs and Trade (GATT) and seeks to conclude bilateral investment treaties with its major trade and investment partners.

On the Chinese side, there are commercial complaints as well. These generally revolve around access to U.S. markets--particularly with respect to textiles--and restrictions on the export of higher level technology to China. A recently signed textile agreement promises more orderly growth, albeit at lower rates, in China's textile export trade with the United States over the next 4 years. With respect to technology transfer, both the United States and China hope that current problems can be resolved expeditiously so that further liberalization can continue.

U.S. Government Trade Promotion

The U.S. Government offers direct assistance to U.S. firms through the U.S. Export-Import Bank (Eximbank), which provides favorable financing for U.S. exports. In addition, the U.S. Trade and Development Program (TDP) funds feasibility studies which give U.S. firms entry to Chinese projects. The Overseas Private Investment Corporation (OPIC) offers certain types of political risk insurance to U.S. investors in China. The U.S. Commerce Department promotes participation by U.S. companies in China's priority industrial projects with trade missions and fairs organized under the auspices of the bilateral Accord for Industrial and Technological Cooperation. Eximbank, TDP, OPIC, and the Commerce Department have all been actively exploring ways to expand their China programs to offer greater services to U.S. businesses. U.S. vendors have good prospects for World Bank and other multilateral development bank financed projects, if they obtain timely project details and bid actively. There are U.S. commercial officers at the Embassy in Beijing (Tel: 532-3831; Tlx: 22701) and the Consulates General in Shanghai (Tel: 332492; Tlx: 33383), Guangzhou (Tel: 677842; Tlx: 44888), Shenyang (Tel: 290035; Tlx: 80011) and Chengdu (Tel: 24481; Tlx: 60128). Agricultural officers are located at the Embassy and in Guangzhou.

Department of State
September 1988

FACT SHEETS ON THE CHINA LAUNCH ISSUE

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THE ADMINISTRATION'S DECISION

THE DECISION

- The Administration decided September 9, 1988 to approve, subject to certain conditions, pending export license applications relating to the sale of US-made satellites to AUSSAT and AsiaSat for launch by the Chinese.

- The conditions, for agreements which will be concluded before the license is issued, are:

  --that the US and the PRC establish a government-to-government agreement to safeguard the technology transfer from possible misuse or diversion,

  --that the US and the PRC reach agreement establishing the liability responsibilities of the Chinese government arising from the Liability Convention, and

  --that the US and China will have an agreement to prevent possible unfair Chinese pricing or trade practices relating to launch competitions.

- In addition, the licenses cannot be issued until after:

  --a 30-day period during which time Congress does not object, and

  --COCOM approval of the licenses.

DECISION CONSISTENT WITH USG POLICY

- The decision represents a continuation of our policy to consider applications for Chinese launch of US-made satellites on a case-by-case basis.

  Case-by-case review preserves our flexibility over future licensing decisions so that we can take into account future Chinese behavior.

- The decision is consistent with US (and COCOM) policy of differentiating between the Chinese and the Soviets with respect to high technology exports.

  --We consider China a "friendly, non-allied" nation.

  --There has been no change in our policy of denying export licenses for Soviet launch of US-made satellites or satellites employing US-origin components. (See fact sheet on this subject.)

- In view of technology and trade safeguards, the decision is also consistent with US national space policy which encourages free and fair trade in commercial space activities while protecting US national security interests.

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- [illegible] rs, the Administration de [illegible] nt to approve, subject to [illegible] , liability, and possibl [illegible] ices. We will keep Congr [illegible] n progress toward fulfil [illegible]

COCOM

- o Initial COCOM consideration of this issue was in June 1988.
- o At that time, the US supported case-by-case review of PRC cases with a presumption of approval, provided national security concerns could be met. We also supported presumption of denial for use of Soviet launch vehicles (consistent with US view of Soviet threat, US export regulations, and COCOM policy of differentiating between the PRC and the USSR).
- o There was no agreement on policy or procedure, and additional discussion was scheduled for November 1988.

PROCESS

- o The AUSSAT and AsiaSat export license applications will be submitted to COCOM, the Coordinating Committee on Multilateral Export Controls, for review after the 30-day Congressional review period.
- o COCOM approval is needed before the US Government can issue the licenses.

ABOUT COCOM

- o COCOM's members are the NATO countries minus Iceland, plus Japan.
- o COCOM maintains an embargo of strategically significant goods and technologies. There are 3 lists: the industrial list (for dual use items), the international munitions list, and the atomic energy list. Satellites are on the munitions list.
- o Proscribed destinations include the Warsaw Pact nations, North Korea, and other communist countries. The PRC is treated differently from the other countries; it is subject to less rigorous controls.
- o COCOM works by consensus; unanimity required for approvals.

ADVANTAGES (OF LICENSE APPROVAL) FOR THE UNITED STATES

FAIR COMPETITION IS GOOD

- Competition makes industry more efficient and helps satellite manufacturers pay lower prices. The consumer is the ultimate beneficiary.

- The key is to ensure that this competition is conducted in a fair manner and that the US commercial launch industry is not disadvantaged.

- The Administration is determined to ensure the ability of the US launch industry to compete on an equal footing with launches from a non-market economy.

- To this end, the Administration intends to begin trade discussions with the Chinese as soon as possible. (See fact sheet on the trade condition.)

CREATION OF US JOBS

- Assuming approval of the AUSSAT license application, approximately $250 million will be spent in the US by Hughes and major subcontractors under the proposed contract. This is roughly 2250 man-years of effort which, spread over a 3-year period, equates to an average of 750 jobs per year.

- Hughes is located in California. Several of its major subcontractors are in Durham, NC; Gendale, AZ; Albuquerque, NM, Niagara Falls, NY; Brigham City, UT; Redmond, WA; Denver, CO; and Newark, DE.

BENEFIT TO US SATELLITE MANUFACTURERS

- The value of US goods and services associated with the AsiaSat export is approximately $40 million. This export would be lost indefinitely if the licenses were not approved. The commercial viability of the AsiaSat consortium depends on the Chinese partner's access to foreign exchange provided by the Long March launch contract.

- The export value of the two AUSSAT satellites and related services and equipment to be provided by the US firm Hughes is about $260 million. Were the license application to be denied, AUSSAT would have to choose an alternate supplier of either the satellites or the launch services. In either case, European firms may well be the beneficiaries, rather than American ones.

- The US commercial communications satellite industry is expected to build over 60% of the free world's communications satellites over the next five years, providing in excess of $2.5 billion in export revenue.

Advantages, contd.

- US satellite manufacturers face increasing competition from European (and soon Japanese) firms.

  --For example, the runner up to Hughes in the AUSSAT competition was the European team of British Aerospace/Matra.

- Permitting US firms to use the most price competitive launcher allows them to remain competitive vis-a-vis both foreign satellite firms and terrestrial competitors such as fiber optics, which has already started to replace satellites in some applications.

BENEFITS FOR THE US LAUNCH INDUSTRY

- The Chinese will enter the international market for launch services with or without US approval, since we and our COCOM Allies do not enjoy a monopoly on satellite production. Conditioning the license on reaching agreement to prevent possible unfair Chinese practices will help ensure a more stable and predictable environment for US launch firms over the long term.

- The conditions we seek will guarantee appropriate Chinese behavior in the entire international market, not simply that portion relating to US-made satellites.

- Allowing limited competition now will strengthen our industry before the Japanese enter the launch services market later in the 1990s.

LICENSE DENIAL MIGHT NOT RESULT IN ADDITIONAL US BUSINESS

- The customers (AUSSAT and AsiaSat)--not the US satellite builder or the US Government--chose the Chinese launch service.

- Had these customers not-chosen Long March, there is no guarantee they would have chosen a US expendable launch vehicle company.

- However, even if AUSSAT decided not to go with the Long March because, for example, the vehicle was not ready in time, it might still go with a non-American firm, i.e., Ariane.

THE TECHNOLOGY SAFEGUARDS CONDITION

THE DECISION

- As a condition for final USG approval of the export licenses for the AUSSAT and AsiaSat satellites, the US and the PRC will establish a government-to-government regime to safeguard the technology from possible misuse or diversion.

BACKGROUND

- Following receipt in the Department's Office of Munitions Control of the AUSSAT and AsiaSat license applications, the Department convened an interagency task force (including representatives from DOD, OSTP, Commerce, and other appropriate agencies) to examine the technology transfer aspect of the proposed safeguards agreement.
- All agencies concurred there were no technology transfer problems which could not be managed by a stringent safeguards agreement.
- The agencies noted two of the most advanced components in the satellites, traveling wave tubes and radiation-hardened microprocessors, are available from foreign suppliers. Separately, the USG has already exported traveling wave tubes to China and radiation-hardened microprocessors to a non-OECD nation for use in its indigenous satellite program.
- No US-origin technical assistance may be transferred to the Chinese related to the design or construction of the Long March IIE launch vehicle under the pending license applications. Such assistance would require a new export license application, and review and approval by the US Government.

NEXT STEPS

- We hope to build our bilateral agreement on a company-to-company technology security plan which the Chinese have already accepted.
- The Chinese Government has stated its readiness to address USG concerns about safeguarding satellite technology.

THE LIABILITY CONDITION

THE DECISION

- As a condition for final USG approval of the export licenses for the AUSSAT and AsiaSat satellites, there must be US-PRC (government-to-government) agreement establishing the liability responsibilities of the Chinese Government.

BACKGROUND

- In addition to any applicable customary international law, the principal legal instruments relating to international liability in the field of outer space are:

  --the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and

  --the 1972 Convention on International Liability for Damage Caused by Space Objects.

- The United States is a party to both conventions. China is a party to the 1967 Outer Space Treaty, but not to the 1972 Liability Convention.

- The Liability Convention provides, *inter alia*, that:

  --a launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight; and,

  --the term "launching State" includes a State which procures the launching of a space object.

- Because it might be argued that the US is procuring the launching of the satellites in question, we want to ensure that, in the event of an accident, China will compensate the United States for any and all liability for which the US may be liable under the Liability Convention or any other applicable international law. The US-PRC agreement will cover this eventuality.

THE TRADE CONDITION

THE DECISION

- As a condition for final USG approval of the export licenses for the AUSSAT and AsiaSat satellites, there must be US-PRC agreement to prevent serious market disruption by the Chinese, including possible unfair Chinese pricing or trade practices relating to launch competitions.

- The Administration is determined to ensure the ability of the US launch industry to compete on an equal footing with launches from a non-market economy. We are convinced our domestic launch industry can compete effectively internationally as long as the playing field is level.

NEGOTIATIONS

- The Chinese Government has formally agreed to hold comprehensive discussions with the United States at an early date.

- The US Trade Representative's office will lead the trade portion of negotiations with the Chinese.

- Other agencies, including the Departments of State, Transportation, and Commerce, will participate as well.

WHAT TO NEGOTIATE

- While we note Chinese statements that the pricing of the launches in question are at promotional rates, we will require adequate assurances from the Chinese Government that Chinese behavior in future launch competitions will not severely disrupt this market.

- An active interagency process chaired by USTR is already underway to finalize negotiating instructions.

- Several possible market disruption safeguards are under consideration, including PRC agreement to:

  --price future launches at "international rates"

  --participate in "rules of the road" talks regarding government involvement in, and support for, the commercial launch industry, and

  --limit the number of future launches to an appropriate level.

US GOVERNMENT POLICY ON SOVIET LAUNCHES OF US SATELLITES

THE DECISION

- The decision to approve (subject to conditions) the export of the AUSSAT and AsiaSat satellites for launch in the PRC in no way changes the US Government prohibition against allowing the launch of similar systems on Soviet boosters (e.g., the Proton rocket).

CLARIFICATION

- The PRC does not pose the same threat to the United States' space assets as does the Soviet Union.
- Soviet and Chinese capabilities to exploit vulnerabilities in US satellites are vastly different.
- Furthermore, within US foreign policy, as within COCOM policy, we differentiate between the Soviet Union and China; the PRC is considered a "friendly, non-allied" nation and, as such, receives a far different trade status than the Soviet Union.
- As an example of this last point, we engage the Chinese in joint military technology projects, a degree of cooperation we have never approached with the Soviets.
- We will strongly resist any pressure, domestic or foreign, to treat the Soviets the same as the Chinese on the subject of satellite launches.

TALKS WITH THE EUROPEAN SPACE AGENCY

BACKGROUND

- The US Government and the European Space Agency (ESA) have met on several occasions since July 1987.
- ESA requested these talks to develop "rules of the road" to discipline government involvement in, and support for, the commercial space launch industry.
- The request followed President Reagan's decision in the Section 301 Transpace Carriers unfair trade practices case. In that case, the President found no cause for action, given the rough similarity of practices by the US Government and the European member governments of ESA, to support their respective commercial launch industries.

RECENT TALKS

- The US and ESA met most recently in July 1988.
- The two sides have made considerable progress in identifying specific governmental practices which directly affect commercial operations. Further work is needed on indirect supports.
- However, the talks have not yet progressed to negotiation.
- The Europeans have expressed considerable concern about additional entrants into a crowded market.
- The US informed ESA at the July meeting about its receipt of the license applications for PRC launch of US-made satellites.
- The two sides discussed possible approaches for third countries, but made no decision on how to proceed.

ESA NOTIFICATION OF THE ADMINISTRATION'S DECISION

- The Administration informed ESA, in Washington and Paris both, shortly before it announced its decision with respect to Chinese launch services.
- The Administration expects to meet with ESA officials in the near future to discuss this matter further.
- The Administration will make every effort to coordinate with ESA.

STATE OF THE US SPACE LAUNCH INDUSTRY

BACKGROUND

- Private sector firms have invested more than $400 million in commercial launch activities. The revenues on that investment are already more than twice that amount: America's three major launch vehicle manufacturers have contracts worth over a billion dollars to launch 18 payloads--11 of them for foreign customers. Launches of these satellites on American rockets will have a positive impact on the trade balance of as much as $660 million in foreign revenue.

- The three largest aerospace manufacturers--Martin Marietta, General Dynamics Corporation, and McDonnell Douglas Astronautics Company--have estimated their combined launch business initiatives will add about 8,000 new jobs to the economy. This does not take into account the direct and indirect employment that could be added as a result of the activity of entrepreneurial start-up firms like Space Services, Inc., American Rocket Company, Conatec, Inc. and E'Prime Aerospace Corporation.

CURRENT STATUS

- Investment. Historically, the major source of investment for development of expendable launch vehicles (ELVs) in areas such as design launch facilities, and tooling has resulted from Department of Defense (DOD) and NASA contracts. The magnitude of that investment as indicated by the size of the total military contracts discussed below is significant. The investment cited earlier represents new, totally commercial investment, separate from DOD contracts.

- Production Capacity. The combined total number of ELVs, both military and commercial, that all U.S. manufacturers can produce in one year is 36.

- Employment. The total number of personnel involved in the development, production, and marketing of U.S. ELVs is in excess of 15,000. (It isn't possible to disaggregate personnel engaged solely in commercial ELV's.)

- Commercial ELV and Payload Commitments. U.S. ELV manufacturers have signed contracts for commercial payloads worth $1-1.2 billion. This represents a total of 13 commercial ELV contracts for launch services comprising 14 payloads.

  --The U.S. Government has firm commitments to purchase launch services for four additional payloads on four ELV's worth an estimated $220 million.

  --U.S. ELV Manufacturers have signed contracts for 48 military launch vehicles worth $4.8 billion.

U.S. COMMERCIAL LAUNCH MANIFEST

(As of June 14, 1988)

COMPANY	PAYLOAD	CUSTOMER LAUNCH DATE
McDonnell Douglas	INSAT 1-D (Govt. of India)	3/89
Conatec	Microgravity Research	3/89 *
Conatec	Microgravity Research	3/89 *
General Dynamics	FLTSATCOM (U.S. Navy)	9/89
McDonnell Douglas	BSBR1 (British)	8/89
Martin Marietta	JCSAT (Japanese)	8/89 +
Martin Marietta	Skynet (British)	8/89 +
Martin Marietta	INTELSAT VI (Intern'l Consortium)	10/89
McDonnell Douglas	INMARSAT-2 Flt#1 (International)	12/89
Martin Marietta	INTELSAT VI (Intern'l Consortium)	2/90
McDonnell Douglas	Rosat (U.S. Govt.)	2/90
McDonnell Douglas	INMARSAT-2 Flt#2 (International)	3/90
General Dynamics	EUTELSAT (European)	3/90
McDonnell Douglas	PALAPA B2-R (Indonesian)	3/90
General Dynamics	GOES I (U.S. Govt.)	7/90
McDonnell Douglas	BSBR2 (British)	7/90
General Dynamics	CRRES (U.S. Govt.)	9/90
McDonnell Douglas	EUVE (U.S. Govt.)	8/91
General Dynamics	GOES J (U.S. Govt.)	11/91
General Dynamics	GOES K (U.S. Govt.)	5/92

*Launch dates may slip to later in the year.

+The payloads will share the same vehicle.

THE US SATELLITE INDUSTRY

INTERNATIONAL MARKET

- The satellite manufacturing industry's major consumers are international organizations (Intelsat, Inmarsat) and foreign national organizations.

- The international market is important both to US satellite manufacturers and to the US balance of trade, where we maintain a strong positive balance.

  --In the last 10 years, Hughes alone has won competitions for international and foreign domestic contracts totalling $2.5 billion for satellites and associated hardware and services.

  --These Hughes contracts resulted in over $2 billion of US exports.

  --The US commercial communications satellite industry as a whole is expected to supply over 60 percent of the free world's communications satellites over the next 5 years, providing in excess of $2.5 billion in export revenue.

- The US holds a commanding lead in the international market, providing most of the satellites used by foreign countries and international organizations for communications and scientific purposes.

- --The major US satellite manufacturers are Hughes, Ford Aerospace, and General Electric-Astro Space.

FOREIGN COMPETITION AND OUR POLICY

- Europe, Japan, and the Soviet Union are increasingly active in communications satellite manufacturing and are trying to compete in the international market.

  --European manufacturers have the technology needed to design, manufacture, test, launch, and operate communications satellites.

  --Japan will probably be a satellite manufacturing competitor soon.

- Unilaterally denying the use of foreign launch vehicles for US-made satellites (or satellites with US-made components) places US satellite manufacturers at a competitive disadvantage. Foreign customers seeking cost savings might be encouraged to choose non-US suppliers.

- The potential threat to the US satellite industry, therefore, needs to be considered when reviewing export license applications for national security reasons.

AUSSAT

- AUSSAT is an Australian quasi-governmental telecommunications company.
- The pending applications are for satellites and related services to replace an older generation whose operational lifetime will end in the early 1990s.
- AUSSAT hopes the satellites can be launched in July 1991 and January 1992, respectively, in order to provide continuity of service to its present (Australian) customers.

  --There is a technical requirement of 33 months lead time to build and prepare the satellites for launch.
- The satellites and most related services are being sold to AUSSAT, not to China.
- China, however, would launch the new satellites from its launch site at Xichang and would receive some interface data in order to properly integrate the satellites to the launch vehicles.

  --AUSSAT required bidders--which included Hughes (the winner), British Aerospace/Matra, General Electric/Aerospatiale/MBB, and Ford Aerospace--to bid the Long March launch as the primary launch option. (Martin Marietta and Arianespace declined to bid on a back-up basis.)
- The contract between Hughes and Australia covers the design, manufacture, test, and delivery in orbit of two satellites on the Long March. Counting the two launches and insurance, the contract value is about $260 million. Additional effort related directly to the contract is another $60 million, according to Hughes.
- Approximately $250 million will be spent in the United States by Hughes and major subcontractors. This represents an average of 750 jobs per year during a three year period of time.
- If the export licenses for AUSSAT are denied, AUSSAT can either keep Hughes and find a new launch service (not necessarily American), or find a new satellite provider (not likely to be American).

ASIASAT

- AsiaSat is a Hong Kong-based consortium which is buying the former Westar-6 telecommunications satellite.

  --The three consortium partners are Cable & Wireless, a British telecommunications firm; Hutchison Telecommunications Ltd., a trade and investment house based in Hong Kong; and CITIC Technology Corporation, a Chinese state enterprise.

- The "AsiaSat I" will inaugurate separate commercial satellite telecommunications services in the Far East. (China is a member of Intelsat.)

- AsiaSat hopes its satellite can be launched in early 1990.

  --Meeting this deadline requires an early license decision because of the 18-month lead time needed to refurbish the satellite.

- The commercial viability of AsiaSat depends on the Chinese partner's access to foreign exchange provided by the Long March launch contract. No other launch service could provide this foreign exchange benefit. Hence, license denial would probably result in a loss of a potential $40 million export of US goods and services.

- The former Westar-6 was manufactured by Hughes and recovered from space by the Space Shuttle in 1984 after it failed to reach geosynchronous orbit.

- Hughes will modify and refurbish AsiaSat I at a plant in California, for launch on the Long March III.

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CRS REPORT FOR CONGRESS

SPACE ACTIVITIES OF THE UNITED STATES, SOVIET UNION AND OTHER LAUNCHING COUNTRIES: 1957-1987

Marcia S. Smith
Specialist in Aerospace Policy
Science Policy Research Division

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February 29, 1988

CHAPTER 1: CHINA

China launched its first satellite in 1970. By the end of 1987, it had made a total of 19 launches, successfully placing 20 satellites into orbit. Several of these have been recovered and some may be related to development of a reconnaissance satellite capability (recovery is necessary for film-type reconnaissance satellites). Several others were not recovered and their missions remain unclear. They could have had scientific missions or could have been related to a different type of reconnaissance capability (electronic intelligence, for example). One launch in 1981 which placed three spacecraft into orbit simultaneously, and one of the 1987 launches, were for science. Others have been for communications. One of the more interesting launches was China 20 in 1987; it was China's first commercial launch, taking a materials processing experiment into space for the French company Matra.

Most Chinese launches take place from Shuang Cheng-tzu (41.2°N, 100.1°E) in the northern part of China (near Jiuquan). The Long March 2 rocket is used at this site. In 1984, the Chinese introduced the Long March 3 (CZ 3) launch vehicle, which has a cryogenic (liquid oxygen/liquid hydrogen) upper stage. The vehicle inaugurated use of a new launch site at Xichang (28°N, 103°E) in southeastern China. The first launch of the Long March 3 did not put the payload in the correct orbit and is counted in this report as a launch success, but a payload failure. Two successful launches of the Long March 3 followed and placed Chinese communications satellites in geostationary orbit.

The Chinese are now actively marketing the Long March 2 and 3 abroad. The 1987 French experiment was launched on a Long March 2. Sweden plans to launch a small communications satellite, Fleza, using a Long March 2 in 1991.

Several American companies have entered into discussions with the Chinese, and some have signed contracts with China to launch communications satellites. Pacific General Telecommunication Corp. (formerly known as Pan Am Pacific Satellite) and Western Union reportedly have launch contracts with the Chinese for use of the Long March 3. In October 1987, the Chinese stated that the Pacific General launch would take place late in 1988. Dominion Video Satellite Inc. had also been cited in the press as having such an agreement for launching a direct broadcast satellite in 1987, but there has been no further information and the launch did not take place.

Determining the actual state of affairs with regard to Western companies launching on Chinese satellites is difficult since accounts in the trade press often vary. The U.S. company Teresat had stated for many months that it had an agreement with China to launch the refurbished Westar and Palapa satellites retrieved by a space shuttle crew in 1984. Teresat never owned the satellites, however, and the Westar satellite was later sold to Pacific General. Teresat later reportedly teamed with Western Union and will be involved in another Westar launch (Westar 6S) in 1988. In some cases, the problem seem to stem from over-anxious promoters confusing "discussions" with "letters of intent" and actual launch contracts. China has stated that 17 foreign companies have contacted the Great Wall Industrial Corporation, part of the Chinese Ministry of Astronautics, which is responsible for these launches. Realistically, there are limitations on how many satellites the Chinese can launch both in terms of the number of launch pads they have (only one for the Long March 3 now, although they are building a second) and the number of vehicles that can be manufactured each year. They also have very little experience with the Long March 3--it has only been launched three times, and the first time it put the payload in the wrong orbit. There were no Long March 3 launches at all in 1987. It is too early to predict what actual effect the Chinese will have on the commercial launch industry.

The Chinese have expressed an interest in weather and land remote sensing satellites, although they have none of their own today. They did inaugurate use of a Landsat receiving station purchased from the United States in 1986, which may also be able to receive data from the French SPOT satellite.

In 1984, China signed three agreements for cooperation in space technology with the Federal Republic of Germany, Italy, and France, and discussions have been held with Brazil. Regarding U.S./Chinese cooperation, the Chinese have indicated that they would like to fly an astronaut on the space shuttle, and in 1986 selected two student experiments for the shuttle once it resumes operations.

The Chinese announced in 1984 that they had flown a puppy into space on a suborbital rocket in 1967. The puppy, named Xiao Bao (Little Leopard), was successfully recovered. They also reported that there had been a major explosion at one of their launch pads on January 28, 1978, which resulted in at least seven people being seriously injured, and a dozen or more people receiving burns to their hair, eyebrows, and faces. In addition, they honored as a martyr a young engineer who helped develop the first geostationary satellite, but died after 6 or 7 years of suffering the health effects of exposure to radiation during experiments related to that task.

It is extremely difficult to discuss the future of the Chinese space program, not only because they do not release very much information about their activities, but also because their plans change quite abruptly. During 1979 and 1980, they expressed great plans for utilization of space, and even had astronauts in training. In late 1980 and early 1981, however, they retreated from their expansive plans because of a reassessment of the Chinese economic situation, and announced that their piloted space program had been postponed for at least the remainder of the decade. Today, they talk boldly about building space stations and a space shuttle, although it does not seem likely that they would do so before the year 2000.

TABLE 8. Chinese Space Launches

Name	Launch Date	Launch Site	Comments
China 1	04/24/70	S	Engineering test. "East is Red" song played until 05/20/70.
China 2	03/03/71	S	Housekeeping test and possible science.
China 3	07/26/75	S	Science? Reconnaissance? Not recovered.
China 4	11/26/75	S	Possible reconnaissance test. Recovered.
China 5	12/16/75	S	Like China 3.
China 6	08/30/76	S	Possible electronics intelligence gathering test and/or science. Not recovered.
China 7	12/07/76	S	Possible reconnaissance test. Recovered.
China 8	01/26/78	S	Possible reconnaissance test. Recovered.
China 9-11	09/19/81	S	Triple scientific payload for space physics experiments.
China 12	09/09/82	S	Possible reconnaissance test. Recovered.
China 13	08/19/83	S	Possible reconnaissance test. Recovered.
China 14	01/29/84	X	First Long March 3 launch; upper stage failed.
China 15	04/08/84	X	First Chinese geostationary communications satellite.
China 16	09/12/84	S	Possible reconnaissance. Recovered.
China 17	10/20/85	S	Possible reconnaissance. Recovered.
China 18	02/01/86	X	Communications.
China 19	10/06/86	S	Possible reconnaissance. Recovered.
China 20	08/05/87	S	Materials processing experiment for a French company.
China 21	09/09/87	S	Science. Recovered.

S = Shuang Cheng-tzu. X = Xichang. Launch dates are in Greenwich Mean Time.

Prepared by CRS based on data from Chinese news bulletins; *World-Wide Space Activities* (House Science and Technology Committee, 1977); and P. S. Clark, The Chinese Space Programme, *Journal of the British Interplanetary Society*, v. 37, p. 195-206, 1984.

88-519 SPR

CRS REPORT FOR CONGRESS

SPACE COMMERCIALIZATION IN CHINA AND JAPAN

Marcia S. Smith
Specialist in Aerospace Policy
Science Policy Research Division

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SPACE COMMERCIALIZATION IN CHINA AND JAPAN

SUMMARY

The availability of space products and services on the world market is becoming an issue of increasing concern as foreign countries compete with the United States. This has become particularly evident in the commercial space launch services area where Europe has successfully challenged what once was an exclusive U.S. market niche. The Soviet Union and China are now also marketing launch services, and there are attempts in the United States and Europe to prevent those countries from becoming a competitive threat, too. (Soviet space commercialization efforts are discussed in a separate paper.)

China's attempts at marketing launch vehicle services have met with some success. They offer the Long March 1, 2 and 3 launch vehicles. French and German companies have booked launches on the Long March 2 for experiments related to microgravity materials processing. Sweden will use the Long March 2 for a small scientific satellite. China reportedly is close to agreement for two Long March launches for communications satellites: Asiasat, to be launched for an international consortium; and Aussat, for Australia. Asiasat (formerly called Westar 6) was built by Hughes, and Aussat will be built by the same company. The United States therefore will have to rule on whether to grant an export license for these satellites. Legislation has been introduced in Congress to prevent the launch of satellites owned by a U.S. entity on a Chinese (or Soviet) launch vehicle. Since Asiasat will be owned by an international consortium and Aussat by Australia, however, the legislation, if enacted, would not apply in either case.

Like China, Japan has the ability to launch satellites into space, but it is not offering commercial launch services because its primary launch vehicle, the "N", is based on U.S. technology (the Delta rocket). The 1969 agreement that allows Japan to manufacture the Delta prohibits the Japanese from launching satellites for third parties without U.S. permission. The situation will change, however, when the Japanese introduce their own large launch vehicle, the H-2. Currently planned for operation in 1992, it will not be encumbered by the 1969 agreement since it will not use U.S. technology.

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SPACE COMMERCIALIZATION IN CHINA AND JAPAN

INTRODUCTION

China has been launching satellites since 1970, and today relies on the Long March 2 and Long March 3 for placing spacecraft into low Earth orbit or geostationary orbit[1] respectively. The Chinese offer launch services using both these vehicles (as well as the smaller Long March 1) on the world market, and they have had some success in attracting customers. The Chinese provide a spacecraft, as well as a launch, for customers wishing to conduct microgravity materials processing experiments.

Japan also has been launching satellites since 1970, but it relies on a U.S. launch vehicle manufactured in Japan under a 1969 agreement that prohibits launching satellites for third parties without U.S. approval. Thus, Japan does not now figure in the commercial launch services marketplace.

China's entry into the launch services market, like that of the Soviet Union, has raised concerns for U.S. companies and France's Arianespace who argue that the government-subsidized prices likely to be charged by these two countries would be unfair competition.[2] Legislation has been introduced in Congress to prohibit launches of satellites owned by U.S. entities by the Soviet Union or China (H.R. 4935). (Issues involved in Soviet launches of

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[1] Geostationary orbit exists above the equator at an altitude of 35,800 kilometers (22,300 miles). A satellite placed there rotates at the same rate as the Earth, so that it appears stationary from a fixed point on the ground. It is used mostly for communications satellites.

[2] ELV Firms Press U.S., Europe To Restrict Chinese Launch Sales. Aviation Week & Space Technology, June 6, 1988. p. 23.

Western satellites are discussed in a separate report[3].) China and Japan may also pursue opportunities in remote sensing and communications satellite services.[4]

CHINA

Since 1970, China has launched 22 satellites. Three of these have been communications satellites that have successfully achieved geostationary orbit. The remainder have been placed into low Earth orbit for a variety of functions, most of which the Chinese have not announced.[5]

Launch Services

Beginning in 1985, a year after the first successful launch of the Long March 3, which is capable of placing satellites into geostationary orbit, the Chinese announced that they would offer launch services on the world market. They stated that they would offer these services at competitive prices and provide insurance coverage.

Since then, there have been frequent media reports in both the Chinese and Western press asserting that contracts had been signed to launch Western satellites using Long March, but these reports apparently were overstated, and may simply have referred to discussions taking place among different parties.

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[3] U.S. Library of Congress. Congressional Research Service. Soviet Space Commercialization Activities. Report No. 88-473, by Marcia S. Smith. Washington, July 6, 1988. 7 p.

[4] For more information generally on the Chinese and Japanese space programs, see: U.S. Library of Congress. Congressional Research Service. Space Activities of the United States, Soviet Union and Other Launching Countries/Organization. Report No. 88-185 SPR, by Marcia S. Smith. Washington, Feb. 29, 1988.

[5] Although some are for science, most appear related to the development of different types of reconnaissance satellites.

Today, three Long March contracts appear to be fairly certain. First, Sweden has an agreement to launch a small Swedish-built scientific satellite, Freja, on a Long March 2 in the early 1990s.[6] Originally, the Swedes planned to launch a small communications satellite called Mailstar, but that satellite apparently will not be built. Freja is a scientific satellite for ionospheric studies (similar to a Swedish satellite called Viking launched in 1986 on Europe's Ariane) and may also carry some of the communications experiments planned for Mailstar.

The two other Long March contracts involve American-built satellites. One is Asiasat-1, built by Hughes and now owned by Hong Kong-based Asian Satellite Telecommunication Co. (called Asiasat Co.)[7] Asiasat Co. is owned by three entities, each having a one-third share: Cable and Wireless PLC of London, Hutchinson Telecommunications Ltd. of Hong Kong, and CITIC Technology Inc., a subsidiary of China is International Trust and Investment Corp. Cable and Wireless has overall management responsibility for Asiasat.[8] Asiasat-1 will be used primarily for Chinese domestic communications needs, but services will be offered to other countries in the area (Thailand and Pakistan, for example). Plans call for the satellite to be launched in 1990.

The other is Aussat, which will be owned by Australia and also built by Hughes. Since both Asiasat and Aussat are the products of an American company, export licenses will have to be obtained. Applications have been filed with the State Department by Asiasat and Hughes, respectively[9]. These actions will undoubtedly stimulate debate about potential economic competitiveness and technology transfer concerns. The primary issue is whether the Chinese are dumping services (selling launch services for less than their actual costs), thus unfairly competing with U.S. companies trying to sell the same services.[10] There is also concern about whether the Chinese would gain access to Western satellite technology. The Chinese have said, however, that they will simplify customs and excise procedures for satellites, and that "the period from when a satellite enters China to the launching will be treated as transit through Chinese territory. Meanwhile China will provide protection for the satellite, unless the client sends its own personnel for that purpose."[11] An Asiasat Co. representative reports that the Chinese have agreed that they will have no access to Asiasat-1 while it is in the country.[12] Transportation for the spacecraft and processing at the launch site will be conducted by U.S. personnel under contract to Asiasat.

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[6] China to Launch Swedish Satellite. Flight International, Feb. 13, 1988. p. 49.

[7] Originally owned by Western Union and called Westar-6, the satellite was launched in 1984. An engine malfunction placed it into an incorrect orbit, but it was retrieved by a space shuttle crew in Nov. 1984 and returned to Earth for repair and refurbishment. It is now ready to be relaunched.

[8] Telephone conversation with representative of Asiasat, July 20, 1988.

The prices being charged for these launches have not been publicly revealed, although in June 1986, the Chinese said that they would charge "10 to 15 percent less than the international rate of about 30 million dollars per geostationary launch," adding that these figures "were only a very rough guide."[13]

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[9] Telephone conversation with Asiasat representative, July 20, 1988; Hughes Applies for Chinese Launch. Defense Daily, July 19, 1988. p. 92.

[10] McDonnell Douglas, Martin Marietta and General Dynamics are among the American companies marketing launch vehicle services.

[11] Beijing Xinhua in English, 1542 GMT, Mar. 13, 1988. In Foreign Broadcast Information Service, China Daily Report, Mar. 14, 1988. p. 27.

[12] Telephone conversation with Asiasat representative, July 25, 1988.

[13] Hong Kong AFP in English, 0200 GMT, June 1, 1986. In Foreign Broadcast Information Service. China Daily Report, June 3, 1986. p. K28.

Microgravity Experiments

In the spring of 1987, the Chinese announced that, in response to requests from foreign customers, they would make recoverable satellites available for use by foreign customers for microgravity materials processing experiments.[14] These satellites are launched by the Long March 2 and remain in orbit for up to 5 days. In August, 1987, the first launch was conducted for the French company Matra. Customers may rent either the entire spacecraft, or part of it. A second launch for the French is expected in 1988. A West Germany-based consortium, Intospace, also reportedly has signed an agreement for a 1988 launch. Intospace says that it is the first of two experiments they will fly with the Chinese.[15] One Western press report states that the Chinese charge $20 million for use of the whole spacecraft, or $30,000-$50,000 per kilogram for a partial payload.[16] A separate report states that Intospace is being charged "less than $1 million" for its first flight.[17] The German experiments weigh 20 kilograms, for a price of less than $50,000 per kilogram, in keeping with the previous report.

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[14] A recoverable satellite has a section that detaches from the rest of the spacecraft and returns to Earth, landing with the aid of a parachute. Microgravity materials processing experiments investigate the production of purer crystals, new metal alloys and better pharmaceuticals in space where gravity does not interfere with the processes.

[15] Soviets, Chinese Book Western Commercial Microgravity Payloads. Aviation Week & Space Technology, Feb. 29, 1988. p. 23. This report says that the satellite will remain in orbit for 8 days, longer than past spacecraft of this type.

[16] Chinese Bid for Reentry Business. Aerospace America, Mar. 1988. p. 19.

[17] Covault, Craig. Chinese Prepare Long March Booster for Launch with German Payload. Aviation Week & Space Technology, July 25, 1988. p. 26. The report also states that China is flying two experiments on the West German equipment and paying Intospace an undisclosed price.

Constraints

There are constraints on what the Chinese can offer in terms of launch services. They have two launch sites, one in Gobi desert (known as Jiuquan or Shuang Cheng-tzu) for the Long March 2, and the other in the southeastern part of the country (called Xichang) for the Long March 3. There is only one launch pad at Xichang, although they are building a second. They have launched the Long March 3 only four times (twice in 1984, once in 1986 and once in 1988), and one was a failure,[18] thus they do not have a well established track record with this vehicle. The Chinese report that the Long March 2 has been launched ten times and there have been no failures. Since the Chinese space program was very secretive for its first 15 years, there is no way to verify the statement, however. Such success/failure statistics are especially important when trying to obtain launch insurance, and whether Western insurance companies would be willing to offer insurance at affordable prices for launch vehicles with such a small pool of experience, and uncertain failure rates, is unlikely.[19] The Chinese offer their own insurance through the Peoples Insurance Company of China "on preferential terms"[20], but whether this would satisfy customer concerns remains to be seen.

The Chinese conduct from one to three launches a year. They claim that they will increase the production rate for launch vehicles to as many as 10 per year,[21] but they also would have to build additional launch and control facilities to support a large number of annual launches. It seems unlikely that they would be willing to make such an investment without assurances of a significant market share.

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[18] The first launch, in January 1984, failed to reach the proper orbit.

[19] For more information on issues involved in space insurance, see: U.S. Library of Congress. Congressional Research Service. Insurance and the U.S. Commercial Space Launch Industry. Committee Print, by Patricia E. Humphlett and David Whiteman. Washington, 1988.

[20] Beijing Zhongguo Xinwen She in Chinese, 0755 GMT, Oct. 25, 1985. In Foreign Broadcast Information Service, China Daily Report, Oct. 28, 1985. p. K1.

Showing their optimism and flexibility, however, the Chinese have announced that they will develop several derivatives of the Long March 2 and 3, and a more capable Long March 4, to meet varying customer needs. One of the proposed Long March 2 derivatives would utilize a U.S. Payload Assist Module (PAM). McDonnell Douglas, which manufactures the PAM, signed a technical assistance agreement with the Chinese in the fall of 1987 and preliminary discussions are underway. An export license would be required for the PAMs to be sent to China.[22]

Legislation introduced by Representative Solomon on June 28, 1988 (H.R. 4935) would complicate Chinese plans if enacted. The bill states that "No satellite owned by a corporation or entity organized under the laws of the United States or of a State of the United States shall be launched from a launch vehicle owned by a controlled country or the Peoples Republic of China." If passed, the bill would not affect Asiasat-1 or Aussat, since they are not owned by U.S. entities, but would lessen the number of satellites available for launch by the Chinese. The bill has been jointly referred to the House Committees on Foreign Affairs, and Science, Space and Technology.

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[21] Beijing, Xinhua Hong Kong Service in Chinese, 0956 GMT, June 6, 1986. In Foreign Broadcast Information Service, China Daily Report, June 9, 1986. p. K2.

[22] McDonnell Douglas' own Delta launch vehicle, using a PAM, might be a competitor with the Long March/PAM combination. A company representative emphasized that they would not offer a PAM for a Long March launch unless the customer had already selected Long March as the launch vehicle. Telephone conversation, July 25, 1988.

Meanwhile, the Chinese have expressed strong irritation at attempts in the United States and Europe to prevent launches of Western satellites on their vehicles. Wu Keli, deputy general manager of China Great Wall Industrial Co. (the part of the Chinese government responsible for marketing launch services), called it "hegemonism in international trade" and asserted that China does not pose a competitive threat because it is "a developing country with a limited rocket production capability."[23] Wu argued that "the low cost of raw materials and cheaper labor in China are the reasons for the low prices."[24]

Remote Sensing and Communications Satellite Services

The Chinese operate a Landsat receiving station that acquires data from U.S. Landsat land remote sensing satellites.[25] Developed by the U.S. Government, the Landsat system now is operated by a private company, EOSAT. Like the other countries with Landsat receiving stations, the Chinese pay an annual $600,000 access fee to EOSAT and are free to sell the data to anyone. In addition to their own sales, China has a contract with EOSAT to market the data for them. China is the only country with whom EOSAT has such a contract.[26]

The communications satellites launched by China are relatively small in capacity and are used for domestic Chinese telecommunications. Once Asiasat-1 is in orbit, however, Asiasat Co. plans to sell regional telecommunications services. As a one-third partner in Asiasat Co., this would generate revenue for China.

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[23] Quoted in: China Attacks West on Space. Flight International, July 2, 1988. p. 38.

[24] Beijing China Daily in English, June 18, 1988, p. 2. In Foreign Broadcast Information Service, China Daily Report, June 20, 1988. p. 46.

[25] Landsat data are used for many purposes, including crop forecasting, land use planning, mineral exploration, and pollution monitoring. There are 12 fully operational foreign Landsat receiving stations including China.

[26] Telephone conversation with EOSAT representative, July 21, 1988.

JAPAN

Japan has successfully launched 32 satellites primarily for science, communications, and meteorology. Japan is a major participant in the U.S./International Space Station program, and is expected to provide one of the four habitation/laboratory modules. The Japanese have indicated considerable interest in microgravity materials processing, and plan to use the U.S. space shuttle to conduct experiments in that field early in the 1990s. As noted, however, today Japan does not play a role in commercial space activities.

Launch Services

The 1969 U.S./Japanese agreement that allows Japan to use U.S. Delta launch vehicle technology states that Japan may use it only for peaceful purposes, and may not launch satellites for third parties without U.S. approval. The Delta, or "N" rocket as the Japanese call it, is used for Japanese communications and weather satellites. Although they have their own indigenously produced launch vehicle, the Mu, it is too small for most commercial users (the Japanese use it for scientific satellites).

Japan is now developing a larger launch vehicle that will be entirely Japanese, however. Called the H-2, it is expected to enter service in 1992. An H-1 version has already flown twice, but since it still uses Delta technology for one of its stages, it is covered by the 1969 agreement. The H-2 will not be subject to those restrictions. Whether they choose to offer the H-2 commercially will depend on several factors. As with any of the commercial launch service providers, the size of the market will be one significant determinant. Japan must also contend with limits on how many times a year it can launch. Fisherman who normally work the ocean near the two Japanese launch sites[27] are not allowed in the area for safety reasons during launches, so the Japanese government has agreements with them that permit only two launches per year from each site. The Japanese have shown interest in building a new launch site elsewhere in the Pacific which might relieve this constraint, but there are no definite plans yet.

Remote Sensing and Communications Satellite Services

The Japanese launched an ocean remote sensing satellite in 1987, and plan to launch a land remote sensing satellite in 1990. Whether they will offer data from these satellites on a commercial basis is unclear. As with China, Japan operates a Landsat ground station and is allowed to sell the data it receives.

The Japanese have invested heavily in communications satellites, and have launched the only operational satellites using the 30/20 Gigahertz frequencies that many consider to be the wave of the future. So far, the Japanese use the satellites only for their own needs, but they could offer regional satellite services in the future.

CONCLUSION

The degree to which China successfully markets launches for communications satellites in competition with the United States and Europe depends on several important factors. First, U.S. decisions on whether U.S. satellites can be exported to China could determine the success or failure of the Chinese effort. If the United States were to treat China the same as the Soviet Union, no satellite containing U.S. components could be launched by Chinese vehicles. Since virtually all free world communications satellites contain U.S. components, this would severely limit China's opportunities. Most observers doubt this would happen, however, since our relationship with China is substantially different than with the Soviet Union (China has most-favored-nation trade status with the United States, for example). If the Solomon bill were enacted, for example, the prohibition would affect only satellites owned by entities established under the laws of the United States. This would leave a sizable market for China, since many other countries (Australia, Indonesia, Brazil, Mexico, for example) buy satellites and launch services.

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[27] The two sites are Uchinoura, used for the Mu series; and Tanegashima, the site from which the N is launched and future home of the H-2.

Another factor, however, is the degree to which China is willing to invest in expanding launch vehicle production rates and providing additional ground support. Their decision will depend, at least in part, on the size of the market and how large a segment they believe they can capture. For geostationary communications satellites, there is already competition from three U.S. companies and Europe's Arianespace. The size of the market in the 1990s, after the current backlog of satellites awaiting launch is gone, is extremely difficult to estimate.[28] The question of market share will also be a factor for the Japanese in deciding whether to enter the launch services business with the H-2.

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[28] In 1986, the four major U.S. launch vehicles (the Space Shuttle, Titan, Delta and Atlas) were grounded because of launch failures (the Atlas was grounded because of similarities with the Delta). The space shuttle has not yet resumed service. Delta and Atlas resumed operations by the end of 1986 and a variant of the Titan was back in service by Feb. 1987. Also in 1986, the European Ariane failed, and did not resume service until Sept. 1987. All these failures created a significant backlog in satellites awaiting launch.

For the Chinese, the Long March 2 and associated materials processing satellites may ultimately prove more profitable, since only they and the Soviets today offer such services. Sales of remote sensing data and communications satellite services may generate some revenue, but these activities are unlikely to pose an economic threat to U.S. companies offering similar products and services. Japan's future in commercial space activities is unclear, but does not pose a problem for U.S. companies for the next few years. The first real indication of Japanese commercialization intentions will probably come when the H-2 launch vehicle is operational.

China in Space

U.S.-China Space Cooperation

1. Landsat

An American firm, ST Systems Corporation, designed and installed a $10 million Landsat receiving and processing station for the PRC in Beijing. The station's computer, exported to the PRC in December 1986, allows the Chinese to review, process and convert data into photographic images from the U.S. Landsat 4 and 5. This deal marks the first license granted for the export of advanced computer technology to the PRC.

The Chinese pay the U.S. a $600,000 annual fee to receive images from Landsat, which allows the Chinese to observe its northern and southern border areas. A second station is planned for western China, which will expand their ability to observe more of the Indian and Soviet borders. Applications for Landsat include mineral and petroleum geology, pollution monitoring, land use and agricultural assessments, maps, and disaster monitoring.

Eosat, the marketing agent for the international sales of images from the Beijing station, signed an agreement with China in 1987 for $1.3 million in initial revenues.

2. Use of Long March Rockets

McDonnell Douglas and China agreed in October 1987 to a technical assistance program for the possible use of the McDonnell Douglas Payload Assist Module (PAM) on Long March rockets. The agreement was signed with the China Great Wall Industries Co., and is designed to serve as the basis for all future proposals involving the PAM and the Chinese. Under the agreement, no technology would be transferred to the Chinese, and the Chinese would not be trained to work with McDonnell Douglas hardware.

3. Role in U.S. Space Station

China talked to NASA officials early in 1987 about their participation in the U.S.-led space station, but NASA felt the program was too far advanced to let the Chinese in. NASA seems more interested in China using the station after it is built. China continues to study building its own space station, but it is considered a long-term program due to China's status as a developing nation.

Two space experiments, chosen from thousands of entries submitted by Chinese students, are scheduled to ride on the American space shuttle in 1988 to make scientific tests in outer space. The experiments, designed by two teenagers, represent the first participation by Chinese students in the U.S. project. They involve collecting space dust and solidifying liquid mixtures.

Chinese Cooperation with Other Nations in Space

1. France

Chinese space authorities and the French firm Matra concluded space cooperation agreements in May 1987 providing for French experiments to be orbited on Chinese rockets. These experiments include microgravity devices. The first experiment, scheduled for August 1987 on a Long March 2 Chinese rocket, was designed to check on consequences of launch-caused acceleration to determine the system's ability to carry research capsules and operate under weightless conditions.

2. Germany

In August 1988, China's Long March 2 carried a recoverable satellite with a West German commercial space processing payload important to pharmaceutical research. The experiment involved the growth of protein crystals in microgravity. This effort represents an important part of drug research, since many protein crystal types cannot be grown on earth, where gravity is too great for significant crystal formation. The Chinese are charging less than $1 million to carry the payload, enabling the Germans to fly low-cost commercial research payloads quickly and inexpensively. A second German payload is scheduled for launch by the Chinese in mid-1989.

3. Sweden

The China Great Wall Industrial Corporation signed a contract in 1986 to launch a scientific survey and postal service satellite for the Sweden Space Company in 1991. Sweden paid the first installment of the service charge in November 1987.

4. U.K.

China and the U.K. signed an agreement in December 1986, under which Chinese scientists will travel to Great Britain to help design a British satellite and British experts will lecture in China. The Chinese also expressed their willingness to provide the Long March 3 rocket to launch British satellites.

5. Australia

The PRC has shown interest in using a proposed space launch site in Australia that is close to the equator. The site appeals to the PRC because its location would allow them to place satellites into equatorial orbits not possible from the PRC Sichuan province launch site. The proposed site is currently under feasibility studies due to be completed in 1988, but it is not certain that the project will be approved.

6. Brazil

Brazil and the PRC will launch two space satellites to collect information for agriculture, mineral prospecting, and cartography. The first is scheduled for 1992, and the second 2 years later, according to an agreement signed in July 1988.

AsiaSat

August 1988

BRIEF ON ASIASAT LAUNCH

This brief covers the issues surrounding the AsiaSat I satellite and the license required to move it from USA to the People's Republic of China (PRC) for launch into geostationary orbit.

The AsiaSat consortium is a UK-Commonwealth controlled commercial project which also involves significant minority participation on the part of PRC. The three partners in the consortium are:

Cable & Wireless PLC which is a worldwide telecommunications organization providing communications services to many countries around the world.

Hutchison Telecommunications Ltd. which is a major trade and investment house based in Hong Kong.

CITIC Technology Corporation is a wholly owned subsidiary of China International Trust and Investment Corporation and is engaged mainly in technology related matters.

The high power domestic satellite capacity of AsiaSat will also make a significant contribution to the social and economic development of the countries it serves.

Background to AsiaSat

AsiaSat intends to inaugerate commercial satellite telecommunications services in the Far East in early 1990. Its initial facility is the WESTAR VI communications satellite, which was recovered from space in 1984 by the Space Shuttle. Pursuant to the Recovery Agreement with NASA, a syndicate headed by Merrett Underwriters at Lloyds (London, UK) contributed $5 million toward the cost of the mission in exchange for salvage and resale rights to the satellite. AsiaSat has concluded a purchase agreement with the lead UK underwriters, thereby building its business base upon the foundation of the NASA recovery.

The AsiaSat business plan is predicated on the ability to restore the recovered satellite for service promptly. To do so will take advantage of the superior industrial capability of Hughes Aircraft Corporation and the assured availability of a Long March launch.

Asia Satellite Telecommunications Co. Ltd.
New Mercury House, 22 Fenwick St., Wanchai, Hong Kong
Telephone: 5-8621836 Telex: 68345 ASAT HX
Facsimile: 5-294136

This combination of schedule and reliability both in terms of spacecraft and the launch vehicle will enable AsiaSat to capture a substantial market in serving the domestic telecommunications in the region.

Through the synergy of the participants, AsiaSat will be able to provide service in China, including Hong Kong and Macau, and the neighboring Asian countries including Pakistan, Thailand, Burma, Nepal, Bangladesh and Korea.

At present in the near time frame there is no alternative source of domestic capacity. The early lead that AsiaSat hopes to establish on behalf of its various owners will enable this important market to be tapped by a Western venture ahead of other near term possibilities including enterprises organized by Japan and the USSR.

Long March III.

The relaunch on Long March will return the recovered WESTAR VI back into operational service. Prior to launch, the recovered WESTAR VI will be modified for AsiaSat use at the Hughes plant in El Segundo, California, where it is presently stored. The essence of the business plan depends on taking advantage of a combination of an available low cost spacecraft which can be prepared in a much shorter timeframe than a new spacecraft, and the concurrent availability of a Chinese launch.

As far as launch options are concerned, the original expectancy was for a shuttle launch, but for obvious reasons, other options were then investigated. The plan is to launch the satellite using a Long March III rocket from China. The PRC shareholding is significant in the choice of launch vehicle in that their use of the satellite will be balanced in respect of foreign exchange by the payment for the launch.

The pricing is not material to the decision to use Long March as the cost quoted by the Chinese is far above the promotional quotations that have been publicized in connection with other projects. Use of Long March is also a priority due to the scarcity of alternatives.

In addition there is an 18 to 20 month launch window available in order to meet AsiaSat's commercial requirements and a very early commitment is necessary to meet this timeframe.

Export Licence Application

An application (Case No.384501) has been filed to secure the necessary US approval for the export and the license would cover the change of ownership to AsiaSat, and the shipment into Chinese territory for the purpose of launch.

The transhipment via PRC raises concerns over technology transfer which are discussed in the comprehensive Technology Control Plan. These are fully described in the application, but their purpose is to preclude any access by PRC to the spacecraft beyond those aspects already in the public domain through press views of the external surfaces.

Payload integration requires the sharing of information which relates to form, fit, dimension and function. An export license (Case No.309443) authorizing an identical exchange of information has previously been granted to Western Union in connection with the possible launch of the identical satellite on Long March.

August, 1988.

SAL:amh:443

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Executive Director
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General Counsel
R. THOMAS WEIMER
Republican Staff Director

November 10, 1988

Douglas A. Heydon, President
Arianespace, Inc.
1747 Pennsylvania Avenue, NW
Suite 875
Washington, DC 20006

Dear Mr. Heydon:

Thank you for your letter of October 7, 1988 which elaborates on your testimony related to the Committee's hearing on the Long March licensing issue.

Certainly our continued discussions on this important issue can only contribute to our further mutual understanding on this and related subjects. Your letter has aided in my own understanding of Ariane practices.

I will include your correspondence in the formal hearing record of September 23, 1988. In addition, I have forwarded a copy of your letter to the Honorable Ron Packard, although I would urge you to discuss this issue with him directly. Finally, I am forwarding for your information a copy of my recent correspondence to the Secretary of State concerning the Long March licensing decision.

Sincerely,

ROBERT A. ROE
Chairman

RR/Tvt
Enclosure

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October 7, 1988

The Honorable George P. Shultz
Secretary of State
Department of State
Washington, D.C. 20520

Dear Mr. Secretary:

The Committee on Science, Space, and Technology has had under active consideration the President's proposed license approval for the export of three U.S. commercial satellites for launch on the Chinese Long March. The Committee has examined this complex issue in two days of extensive hearings involving government witnesses; the principal private parties directly involved in the licensing decision; outside experts on China; and representatives of American launch and satellite industries.

Following the committee's careful scrutiny of this issue and vigorous discourse with affected parties on the implications of this licensing decision, I have concluded that the licensing decision outlined in the President's notification to Congress, including the specific conditions therein, is responsible, fair and prudent to the overall interests of the United States. Moreover, this license and the conditions to which it is subject present significant opportunities to this country that extend far into the future.

I am firmly convinced that a decision not to export these satellites would be fundamentally inconsistent with United States interests in expanding world trade and enhancing the competitive position of U.S. industry abroad. If we impede the export of these U.S. manufactured satellites, we would disrupt a truly international marketplace by interfering in the rights of nations and other customers to make commercial determinations for themselves. In the long run, this could cause irreparable harm and precipitate a decline of American aerospace preeminence.

We must ensure that that our industry can remain resilient to the market fluctuations created by the enormous risks that have burdened the aerospace industry as a result of launch and satellite failures over the last few years. This trend toward lower risk turnkey procurements of satellites through delivery in orbit is the mark of the present and future, and we must ensure that our industries can respond accordingly.

The benefits of expanding our trade horizons become self evident when we look toward the immediate trade impact of this decision--these three satellite exports translate into $300 million of export revenues. The benefit to our balance of trade is substantial. Moreover, the enormous potential presented by an expanded presence of U.S. commercial interests in the Pacific Rim benefits our national interests as well. Others will fill any void we create.

I encourage you to proceed expeditiously to negotiate the three relevant agreements with the Chinese in connection with this license. Clearly, any agreement must provide complete assurance that U.S. national security interests are protected. The Congress should be fully and currently informed as you proceed in this regard.

With respect to any agreement concerning Chinese acceptance of liability for damages, I urge that the Administration be mindful of the significant obstacle that risk of liability has presented to the U.S. commercial launch industry in marketing launch services. I urge that any negotiations on the liability issue fully recognize the nexus between risk of liability and worldwide competitiveness. Liability and risk sharing considerations may also be involved as an element of a fair pricing agreement.

The third condition of this license, relating to an agreement to prevent possible unfair Chinese pricing or trade practices relating to launch competitions, presents perhaps the most significant opportunity to our national interests. During the last year, the committee has developed legislation designed to enhance the competitiveness of the U.S. launch and satellite industries. The legislation (H.R. 4399, Commercial Space Launch Act Amendments) encourages the development of a western policy toward competition in commercial space from non-market economies through a process involving other western nations. U.S. policy decisions would be substantially validated through such a process. In this connection, I would strongly urge that our negotiations with the Chinese concerning a fair pricing agreement proceed in consultation with the Europeans. Discussions conducted with Europe over the last several years on the subject of international launch competition should also be continued. These discussions represent an opportunity we may not have again.

I encourage you as you seek to open this important new dimension of relations with the Peoples Republic of China.

Sincerely,

Robert A. Roe
Chairman

arianespace
inc.

October 7, 1988
DH 88.1031

The Hon. Robert A. Roe
Chairman
Committee on Science, Space and Technology
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

As President of Arianespace, Inc., the U.S. subsidiary of Arianespace, S.A., I represent a foreign organization, and am so registered with the U.S. Department of Justice under the Foreign Agents Registration Act.

I would like to thank you for including me among the witnesses heard before your Committee on September 23, and allowing me the opportunity to answer the many excellent questions raised by you and others of your Committee. On further reflection, and having followed as well the hearing before Chairman Fascell's Committee on Foreign Affairs on September 28, there are several additional points that I would very much appreciate having included in the record. I have also written a letter similar to this to Chairman Fascell.

My principal concerns are focused on some of the misunderstandings and distortions that have crept in to the discussion of this subject, and continue to be put forward to support various other arguments and positions. There are three of particular concern:

- "Ariane subsidy,"
- "Low, introductory pricing by Europe,"
- "If the U.S. doesn't issue these licenses, the Europeans will take the business away."

With your indulgence, I would very much like to touch briefly on each of these points, and elaborate on how they are being misused.

"Ariane Subsidy" - This subject has been around for a long time, and was brought to a head by the Section 301 complaint filed by Transpace Carriers, Inc. against the European Space Agency (ESA) and Arianespace in May, 1984. As noted on pages 2-3 of my earlier testimony, this proceeding was completed without any finding of unreasonable trade practices, by the President's determination in July, 1985. More importantly, at the urging of the European delegation both during and after the proceeding, consultations were begun toward the objective of defining "rules of the road" concerning the appropriate role of government in the launch service area, including assistance to private sector launch services companies such as the U.S. ELV companies and Arianespace. The environment then involved the Space Shuttle as a player in the commercial arena, and it was the U.S., not Europe, who appeared to be reluctant to move ahead with consultations/negotations on rules of the road.

Nevertheless, considerable progress has been made during the more than three years of sporadic discussions; enough that our U.S. competitive colleagues at Martin Marietta and General Dynamics have publicly acknowledged, in various meetings and other fora, that Europe and the U.S. have indeed reached agreement that the elusive "level playing field" already exists between these two western allies. What is not fully appreciated is that nothing has changed in the relationships between Arianespace, the European Space Agency or the government of France. There has been no need for change, since the subsidy claim was wrong from the start.

It is therefore doubly disturbing when responsible public figures such as Representative Packard of California make erroneous statements, as he did on the floor of the House last Friday, that "The French government has been subsidizing their [Ariane] launches and thus we have been exporting our launches to the cheaper Ariane. We have been desperately looking for an opportunity to bring the French to negotiate fair and equitable competition for launch facilities. While our launch has been crippled. Once the Chinese offered attractive launch pricing - all of a sudden the French are now willing to come to the table." (Quote taken from page H9241 of the House Congressional Record.)

Mr. Chairman, those statement are simply wrong, on every count. I have no idea where Mr. Packard gets his information, but it is incorrect. There is not, and never has been, any subsidy paid by either the government of France or ESA to Arianespace. The representatives of ESA have been in consultations with the U.S. Trade Representative for several years, at the initiation of Europe. Our only response to the Chinese offers of "attractive pricing" has been a reasonably stated view that if they want to play in the western world's sandbox, they too should be prepared to follow any rules of the road which our respective governments may formulate. You may recall that my short form summary of the Arianespace position for your September 23 Committee hearing was "international rules of the road".

"Introductory Pricing" - Much has been made of the fact that the first Ariane 4 flight, successfully completed on June 15 of this year, carried the commercial PanAmSat satellite for a "below market" price. This fact has been used to argue that it is okay for the Chinese to offer commercial launches for one third to one half of the prices that western launch service providers, U.S. or European, must charge to cover costs and make a small profit. The facts are these:

- o This flight was an ESA development flight, under the aegis and control of ESA; the incorporation of live payloads was considered experimental.

- ESA was prepared, and originally had planned, to fly the flight with ballast (a dummy satellite filled with sand) in the space later assigned to the PanAmSat satellite; only shortly before the originally planned launch was this space offered to an available satellite on a "risk" basis.

- PanAmSat was the only "taker" of the available opportunity; it was offered to the satellite community at large, by Arianespace acting in support of ESA, without evidence of serious interest. This offer was made in 1985, not "recently" as has been misstated by several people.

- PanAmSat would not have flown on a standard commercial flight, with Arianespace, Shuttle or any U.S. ELV launch supplier (had they been available at the time), because they simply could not afford the price of a "regular" launch. They were willing to accept the higher risk of a developmental launch because of the lower cost involved.

- Given the fact that PanAmSat was in the vanguard in implementing the U.S. separate satellite policy in competition to INTELSAT, it is ironic that the only launcher PanAmSat could find acceptable to it was the developmental flight of the European Ariane 4 and at a price which U.S. officials now choose to denounce.

- There was no commercial gain to any organization resulting from this transaction. Arianespace was reimbursed by ESA only for the actual costs incurred in connection with the integration analyses and administrative activities; the amounts were on the order of $100,000. All other payments were passed through to ESA and applied by it against the development cost of the program.

These facts all differ substantially from the situation related to Long March. Long March 3, the smaller Delta class vehicle, is not a new launcher, having flown many times before the expected AsiaSat launch. Indeed, the AsiaSat spokesmen have stressed its availability as a major point in their comments. The Long March CZ-2E on the other hand, proposed for the two AUSSAT launches, is a new "growth" version of the basic Long March family, so if consistency with ESA practice was being cited, there would be at most one such offer, and it would be from the Chinese space agency, not the China Great Wall Industry Corporation. We have no evidence that the "introductory pricing" will not be maintained for the foreseeable future. Finally, there are available today several proven, reliable and capable alternatives with far less uncertainty than surrounds the Long March CZ-2E.

"Europe will steal the business" - As I pointed out in the discussion before Chairman Roe's Committee, three of the four satellite bidders and two of the four launch service bidders involved in the AUSSAT proposal process are American. One of each is European. If AUSSAT should decide to rebid the entire job, based on a U.S. refusal to issue an export license for Long March launches, there is still a large statistical bias in favor of the U.S. getting the business. In fact, the sole European satellite bidder, British Aerospace, has consistently supported the position that it is not in Europe's long-term interest to use Long March as a weapon in their competitive battles with the major U.S. satellite builders.

Recent history shows clearly that in head-to-head competitions for launch services between Arianespace and our U.S. colleagues, the competition is close, tough, and far from predetermined, no matter who the customers might be. It is interesting to note that since the U.S. ELV suppliers announced their intent to enter the commercial market, all of their non-government commercial success has been in the foreign (non-U.S.) markets:

Titan: 1 JCSAT (Japan)
2 INTELSAT (International)
1 SKYNET (U.K.)

Atlas: 1 EUTELSAT (European)

Delta: 2 BSB (U.K.)
2 PALAPA (Indonesia)
1 INSAT (India)
2 INMARSAT (International)
1 NATO IVA (U.K./International)

Does this appear to be "Europe stealing the business"? I think not. We have every reason to believe that the chances of Titan or Atlas being selected over Ariane, in lieu of Long March, are just as high now as they have been in these earlier successes. This is the substance of competition, and we welcome it!

While there is much more that can be said on these subjects, I have tried to limit my comments to the most significant aspects. Thank you for your consideration in including these remarks as part of the record of discussion of this complex and difficult subject. I would be pleased to meet with you and other interested members and staff to discuss these points in greater detail and answer questions, at any time in the future which is convenient.

Sincerely,

Douglas A. Heydon

Douglas A. Heydon
President

DAH/wp

cc: Mr. Lujan
Mr. Nelson
Mr. Walker